# epiSTEME 6

**Homi Bhabha Centre for Science Education, Mumbai**
**15-18, December, 2015**

## Conference Program

**Program summary**
The epiSTEME 6 conference includes review talks, paper sessions, a poster session, a session on doctoral student projects, workshops and a panel discussion.

There will be 7 review talks. Each review talk will be for 60 minutes (~45 minutes talk and 15 minutes for discussion). There is a pre conference workshop from 7-11 December and a post conference workshop on 22nd December.

There will be 8 Paper Sessions spread over the four days, which comprise a total of 26 oral presentation papers. The time allotted for each paper is 25 minutes, which includes 20 minutes of presentation, followed by a 5-minute Q&A. A laptop, LCD projector and PA system will be available in the auditorium.

There will be a 1 ½ - hour poster session, in which 22 posters will be displayed. During the poster session, the presenters of the poster papers will interact with the conference participants and explain their posters. Please check the poster guidelines on page 7 for preparing posters.

Apart from these academic programs, there will be evening activities: banquet, cultural program, and a trip to Urban Haat - an Indian handicrafts and handloom exhibition in the suburbs. There will be lunch and tea breaks between talks.

## Detailed schedule

## DAY 1, Tuesday, December 15

| | | |
|---|---|---|
| 8.00 - 9.00 am | Registration | |
| 9.00 - 9.15 am | Inauguration | Welcome by HBCSE Director and episteme 6 Conveners |
| 9.15 - 10.15am | Review Talk 1 | A theory of action for supporting improvements in the quality of mathematics teaching on a large scale<br>*Paul Cobb* |
| 10.15 - 10.45 am | Tea | |
| 10.45 -11.45 pm | Review Talk 2 | From test tubes to Youtube: Nature of science in socio-scientific issues and history<br>*Douglas Allchin* |
| 11.45 -1.00 pm | Paper Session 1 | Rethinking gesture with new multi-touch digital technology<br>*Nathalie Sinclair*<br><br>Emerging ideas of generalization, proof and proving among grade 6 students<br>*Rakhi Banerjee and K Subramaniam*<br><br>Multiplying integers – mathematising to make sense<br>*Usha Menon* |
| 1.00 - 2.00 pm | Lunch | |
| 2.00 - 3.00 pm | Review Talk 3 | CTSIM: A computational thinking environment for learning science using simulation and modeling<br>*Gautam Biswas* |
| 3.00 - 3.30 pm | Tea | |
| 3.30 - 5.10pm | Paper Session 2 | Fully online methods courses? Reconceptualizing STEM teacher preparation through "spaces of learning"<br>*Geeta Verma, Heather Johnson, Joanna Dunlap and Evan Mcclintock*<br><br>Enhancing urban teachers' STEM and leadership capacities: A preliminary report on a unique private-public-public partnership<br>*Punya Mishra, Leigh Graves-Wolf, Christopher Seals, Rohit Mehta and Inese Berzina-Pitcher*<br><br>Teacher empowerment through action research<br>*Ratna Singamsetty and Neeraja Raghavan*<br><br>A study on the epistemological beliefs of university teachers in India<br>*Mahima Chhabra and Bharati Baveja* |
| 6.30 pm onwards | Banquet | |

## DAY 2, Wednesday, December 16

| | | |
|---|---|---|
| 9.00 - 10.00 am | Review Talk 4 | GeoGebra: A disruption in STEM education<br>*Stephen Jull* |
| 10.00 - 11.15am | Paper Session 3 | Does interactive visualization affect motor cognition and learning outcomes of students?<br>*Sanju Saha and Santoshi Halder*<br><br>Does it work? Using computer game as a tool for learning – teaching early algebra<br>*Izabela Solarz*<br><br>Role of interactive simulation in understanding the electric field<br>*S Shubha and B.N. Meera* |
| 11.15 - 11.45 am | Tea | |
| 11.45 -1.00 pm | Paper Session 4 | Using programming with rural children for learning to think mathematically<br>*Sanjeev Ranganathan, Bala Anand, Sundranandhan Kothandaraman and Vaidegi Gunasekar*<br><br>Effect of blended learning strategy on learning science among secondary school students<br>*Dhanya Krishnan*<br><br>Mathematics and science assessment for 12 year-old students – the Romanian experience – increasing the effectiveness of the teaching-learning-assessment process using information and communications technology<br>*Gabriela Streinu-Cercel and Bogdan Cristescu* |
| 1.00 - 2.00 pm | Lunch | |
| 2.00 - 3.00 pm | Review Talk 5 | When is a grounding 'Good', for whom, and how can we build them?<br>*David Landy* |
| 3.00 - 4.30 pm | Workshop 1 | Design rationale for Geogebra<br>*Stephen Jull* |
| 4.30 - 6.00pm | Poster session + Tea | List of poster papers on page 6 |
| 6.30 pm onwards | Cultural program and dinner | |

**DAY 3, Thursday, December 17**

| | | |
|---|---|---|
| 9.00 - 10.00 am | Review Talk 6 | Modeling theory and modeling instruction for STEM education<br>*David Hestenes* |
| 10.00 - 10.50am | Paper Session 5 | Diagnosing alternative conceptions in the nature of thermodynamic variables and entropy<br>*Sapna Sharma and P.K. Ahluwalia*<br><br>Use of multiple representations to promote students' understanding of phase changes<br>*A.R. Sitalakshmi and Bharati Baveja* |
| 10.50 - 11.45 am | Tea, and display/demo session on doctoral students' projects | |
| 11.45 - 1.00 pm | Paper Session 6 | Interactive effect of meta-cognitive strategies-based instruction in Mathematics and self-efficacy of students on their meta-cognitive awareness<br>*Meenakshi Ingole and Shefali Pandya*<br><br>I care about the beauty in science: aesthetics in scientific practice and pedagogy<br>*Punya Mishra, Sarah Keenan, Rohit Mehta and Danah Henriksen*<br><br>Improving the performance of Physical Science learners: A case study at Mandlethu School, Mpumalanga Province, South Africa<br>*Prem Heeralal* |
| 1.00 - 2.00 pm | Lunch | |
| 2.00 - 3.00 pm | Review Talk 7 | Research in chemistry education and its implications for teaching and learning of chemistry at tertiary level<br>*Savita Ladage* |
| 3.00 - 3.30 pm | Tea | |
| 3.30 - 5.10pm | Paper Session 7 | Using diagrams in inclusive learning situations<br>*Amit Sharma and Sugra Chunawala*<br><br>Paths to achievement motivation of women physics majors in India: Mediational roles of career values and family values<br>*Paromita Ghosh*<br><br>Teachers' perceptions of dealing with mixed ability classrooms<br>*Smruti Mirani and Sugra Chunawala*<br><br>Revisiting "television for social education"<br>*T.V Venkateswaran* |
| 5.30 pm onwards | Trip to Urban Haat – Indian handicrafts and handloom exhibition | |

**DAY 4, Friday, December 18**

| | | |
|---|---|---|
| 9.00 - 11.00 am | Workshop - 2 | Design Research Methodology: Orientation and Issues<br>*Paul Cobb* |
| 11.00 - 11.30 am | Tea | |
| 11.30 -1.10 pm | Paper Session 8 | A middle school science teacher's classroom talk: Discourse characteristics and question types in a unit on energy<br>*Jazlin Ebenezer and Shamarion Grace*<br><br>How do experts and novices navigate Chemistry representations – an eye-tracking investigation<br>*Prajakt Pande, Prateek Shah and Sanjay Chandrasekharan*<br><br>Presentation of structure of atom in Chemistry textbooks in India based on a history and philosophy of science framework<br>*Puneeta Malhotra*<br><br>Traversing the epistemology of probability in Indian mathematics textbooks<br>*Haneet Gandhi* |
| 1.10- 2.10 pm | Lunch | |
| 2.10 - 3.40 pm | Panel | Large scale field implementations of educational technology projects<br>*Panelists:*<br>*Padma Sarangapani*<br>*Sridhar Rajagopalan*<br>*Sridhar Iyer*<br>*Neil D'Souza* |
| 3.40 - 4.10 pm | Closing ceremony + Tea | |

## Pre and Post Conference Workshops

**Pre conference workshop, 7-11 December**

*Mapping Data and Knowledge for Citizen Science*

This workshop will provide an overview of the current state of mapping technologies, teach the basics of data collection, management, and dissemination including building databases, APIs, and applications for education and citizen science.

**Post conference workshop, 22 December**

*Teaching the Nature of Science through Historical Case Studies*
**Douglas Allchin**

This is a workshop for teachers interested in experiencing and discussing a sample class using a historical case study to teach the nature of science. We will follow and participate in the investigations of Christian Eijkman, who studied the cause of beriberi in Java in the 1890s and eventually won a Nobel Prize for his efforts. Following the classroom experience, we will discuss the method of teaching cases and practical skills for teachers.

---

**List of Poster Papers**

| | |
|---|---|
| Impact of parental socio-economic factors on students' performance in JEE-IIT examinations | *Naresh Kumar* |
| Synergism through Google classroom, a blended learning platform: Effectiveness, operability and challenges | *Sreetanuka Nath* |
| Using multi-media and classroom computer networking for evaluation and analysis | *Ajay Wadhwa, Aakash Gupta and Yash Mohan Sharma* |
| Teaching children "how do we see?" | *Deepak Dixit and Aanchal Chomal* |
| Construction of geometry proofs: A regression analysis of knowledge strands | *Mohan Chinnappan* |
| Tentativeness of Scientific Theory: What do high school students believe? | *Ajeet Rai* |
| Developing a curricular framework for ecological sensibilities: Exploring the activity of urban gardening as a relevant and critical intervention | *Deborah Dutta and Sanjay Chandrasekharan* |
| Exploring the effectiveness of constructivist approach on academic | *Animesh Mohapatra and Poonam Kumari* |

| | |
|---|---|
| achievement in Biology at higher secondary level | |
| Quantified closed-loop internalization of mathematics | *Jaya Swaminathan, Ragini Bhartari, Shalini Sinha, Sheloney Moni and Shankar Moni* |
| Exploring students' thought processes involved in the interpretation of electric field and field lines | *Manasi Goswami and Bijay Kumar Parida* |
| How construction of diagram effect adolescent students' performance in science education? | *Sudeep Sarkar, Santoshi Halder and SanjuSaha* |
| Exploration of students' physics problem solving approach using lateral scaffolding technique | *Balasubrahmanya Hegde and Meera Nagarajarao* |
| Exploration of mathematics learning of school girls in Delhi | *Puja Pratihasta and Manisha Wadhwa* |
| Reforming board exams for learning with understanding | *Raghav Rohatgi and Pranav Kothari* |
| Exploration of ways schools and teachers can nurture the non-cognitive aspects in children | *Vijayalakshmi Iyer, Sharanya Sudhakar and Parul Dewan* |
| Classical-quantum interface at undergraduate level: visualization of wavefunction | *Mahima Chhabra and Ritwick Das* |
| Exploring the transient phenomena of electromagnetic induction | *Amit Dhakulkar and Nagarjuna G* |
| Cheating detection in low stakes testing | *Dipti Lal* |
| Reflective practices in lesson planning: An endeavour for pre- service teachers' professional development | *Jasneet Kaur and AshuThreja* |
| Analyzing the role of digital media in science education: A distributed cognition approach | *Prateek Shah and Sanjay Chandrasekharan* |
| Designing a technology enhanced learning environment for hypothetico-deductive reasoning in genetics | *Anurag Deep* |
| Developing Reflective Teachers Through Action Research | *Neeraja Raghavan, Tapasya Saha, Vipin Chauhan, Aanchal Chomal, Deepak Dixit, Ambika Mohan and Vartul Dhaundiyal* |

## Poster Guidelines

- Posters will be displayed in a separate room in the conference venue. Your poster will be identified by your paper ID.
- Each poster presenter will be provided with one poster board of size 4 feet(W) x 3 feet(H) (i.e. landscape mode) for their poster display. Presenters should prepare their posters accordingly.
- Tape / pins will be available to mount the posters to the boards.
- The poster session is scheduled for Day 2, December 16, 2015 at 4.30pm. During this session, conference attendees will walk through, visit your poster and interact with you. Please be available next to your poster during this time to explain your work and answer questions. There will be no formal presentations.

- Posters will be up throughout the duration of the conference. Conference attendees are also likely to visit your poster during Tea breaks, so you can use Tea breaks too for explaining your poster.
- Please make sure your poster has the title displayed at the top, and the author names. Additional tips - Effective posters:
    - Invite attention
    - Present a clear message
    - Have a balance of graphics and text
    - Have self-explanatory tables and figures
    - Organize materials coherently
    - Maintain a logical sequence, requiring no further explanation
    - Are based on evidence, thereby appealing to a critical audience
    - Have large size of fonts in text, figures and tables, so as to be easily readable and visible from a distance (of say, 1.2m or 4 feet)
- Some additional links on poster presentations:
    - http://people.eku.edu/ritchisong/posterpres.html
    - http://colinpurrington.com/tips/poster-design