Workshop: PSE State of the Art

29 Jan – 1 Feb 2017

Best Western Plus Heritage Hotel

Cox's Bazar, Bangladesh

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The objective of the workshop is to create a forum for researchers within the international process systems engineering (PSE) community to discuss the state of the art and the future challenges in selected fields of PSE, leading to a roadmap that defines the future directions of research in PSE and hopefully, also to motivate and encourage researchers to develop new ideas, propose novel methods and apply a truly systems approach to problem solution.

The workshop is organized and hosted by Prof Rafiqul Gani (born in Bangladesh and currently a professor at the Technical University of Denmark) with administrative support from the Chemical Engineering Department of the Bangladesh University of Engineering and Technology (BUET). The workshop is sponsored by the family trust (known as SBK Trust) of Prof Rafiqul Gani.

Organization Committee:
Prof Rafiqul Gani, DTU, Denmark
Prof M M A Shoukat Choudhury, BUET
Dr. Nahid Sanzida, BUET
Mr. Ahaduzzaman, BUET
Mr. Noor Mohammad, BUET
Prof M Nazmul Karim, Texas A&M Unversity, College Station, USA
Mr. Zillur Rahman, SBK Trust & Rahman Chambers

Scientific Committee:
Prof M M A Shoukat Choudhury, BUET, Dhaka, Bangladesh
Prof Mario R Eden, Auburn University, Auburn, USA
Prof Rafiqul Gani, Technical University of Denmark, Lyngby, Denmark
Prof Marianthi Ierapetritou, Rutgers University, New Jersey, USA
Prof M Nazmul Karim, Texas A&M Unversity, College Station, USA
Prof Jay Lee, KAIST, Daejon, Korea
Prof Stratos Pistikopoulos, Texas A&M University, College Station, USA
Prof Ana Povoa, University of Lisbon, Lisbon, Portugal
Prof Fengqi You, Cornell University, Ithaca, USA

Social Program:
29 Jan: 09:00 – 17:45, free time to enjoy the sea and the beach.
30 Jan: 14:00 – 17:45, free time, networking, sight-seeing.
31 Jan: 14:00 – 17:45, free time, networking, sight-seeing.

Dinner:
Every night at 20:00

Technical Program

29 Jan, 17:45 – 20:00): Introduction
17:45 Welcome & Introduction (Rafiqul Gani; Dr. Ijaz Hossain, BUET)

Session 1: Challenges for PSE

18:00	Lecture 1.1	Prof E N Pistikopoulos	Process systems engineering: a personal perspective
18:20	Lecture 1.2	Prof M R Eden	New generation software-tools
18:40	Lecture 1.3	Prof M Ierapetritou	Challenges and opportunities in PSE applications areas
19:00	Lecture 1.4	Prof F You	Multi-scale life cycle optimization
19:20	Lecture 1.5	Prof A Póvoa	Design and planning of sustainable supply chain
19:40	Lecture 1.6	Prof F Friedler	Process design and operation: composition vs decomposition

30 Jan, 08:30 – 13:00: Topical sessions
Session 2: Modelling and numerical methods (coordinator: Prof Iqbal Mujtaba)

08:30	Introduction (Prof I Mujtaba)		
08:40	Lecture 2.1	Prof S Assabumrungrat	Simulation of an intensified process of sorption enhanced chemical-looping reforming of methane
09:00	Lecture 2.2	Prof I Karimi	Modeling and design of LNG processes
09:20	Lecture 2.3	Prof L E K Achenie	Agent based modeling in engineering Systems
09.40	Lecture 2.4	Prof R Gani	The need for models and modelling tools
10:00	Discussion		

10.30 – 11:00 Break

Session 3: Process synthesis-design, intensification (coordinator: Prof G Guillen Gosalbez)

11:00	Introduction (Prof G Guillen Gosalbez)		
11:10	Lecture 3.1	Prof W Kiatkittipong	Process design of biodiesel production via ester-and transesterification in a reactive distillation
11:30	Lecture 3.2	Prof X Chen	A framework of simulation and optimization of polymerization processes with molecular weight distributions
11:50	Lecture 3.3	Prof E Perez-Cisneros	Theoretical and conceptual developments in separation process synthesis-design
12.10	Lecture 3.4	Prof G. Guillen Gosalbez	On the combined use of mathematical programming and life cycle assessment in sustainability problems
12:30	Discussion		

Lunch 13:00

30 Jan, 18:00 – 20:00: Topical sessions
Session 4: Product synthesis, design, integration (coordinator: Prof Mariano M Martin)

18:00	Introduction (Prof Mariano M Martin)		
18:10	Lecture 4.1	Prof M M Martin	Integration of renewable based processes: Process and product design
18:30	Lecture 4.2	Prof L E K Achenie	Pharmacokinetic modeling in oral drug delivery
18:50	Lecture 4.3	Prof M R Eden	Multiscale chemical product design
19:10	Lecture 4.4	Prof R Gani	PSE and chemical product design
19:30	Discussion		

31 Jan, 08:30 – 13:00: Topical sessions
Session 5: Planning, scheduling and supply chain (coordinator: Prof Fengqi You)

08:30	Introduction (Prof F You)		
08:40	Lecture 5.1	Prof F You	Leveraging big data analytics and machine learning for optimization under uncertainty
09:00	Lecture 5.2	Prof M Ierapetritou	Decision making across different scales: from process control to supply chain management
09:20	Lecture 5.3	Prof J H Lee	Planning and scheduling of hybrid renewable energy network using a stochastic optimal control technique
09.40	Lecture 5.4	Prof E N Pistikopoulos	Towards the 'grand' integration of design, control & scheduling
10:00	Discussion		

10.30 – 11:00 Break

Session 6: Process control, operation and decision support systems (coordinator: Prof Jay H Lee)

11:00	Introduction (Prof Jay H Lee)		
11:10	Lecture 6.1	Prof M M A S Choudhury	State of the art in process monitoring and fault diagnosis
11:30	Lecture 6.2	Prof R Gani	A driving force based method for integrated process design-control
11:50	Lecture 6.3	Prof I Mujtaba	Generic model based control for MSF desalination processes
12.10	Lecture 6.4	Prof Nazmul Karim	Process control and optimization for biological systems
12:40	Discussion		

Lunch 13:00

31 Jan, 17:45 – 20:00, Topical sessions
Session 7: Domain applications (biomedical; energy; water; etc) (coordinator: Prof Iftekhar Karimi)

17:45	Introduction (Prof Iftekhar Karimi)		
17:55	Lecture 7.1	Prof I Mujtaba	Integrated trickle bed reactor - reverse osmosis process for the removal of phenol from wastewater
18:15	Lecture 7.2	Prof F Friedler	Synthesis technology for reliability analysis of processing systems
18:35	Lecture 7.3	Prof Z Kravanja	Synthesis of inherently safer process systems
18:55	Lecture 7.4	Prof E N Pistikopoulos	Multi-scale energy systems engineering
19:15	Lecture 7.5	Prof J Woodley	The role and challenges for PSE - bioprocesses for the production of chemicals
19:35	Discussion		

1 Feb, 08:00 - 11:15, Special overview lectures (Session 8)

08:00	Lecture 8.1	Prof J H Lee	Model predictive control: overview
08:30	Lecture 8.2	Prof Z Kravanja	Synthesis of sustainable systems – from concepts to applications
09:00	Lecture 8.3	Prof A Póvoa	Supply chain risk & resilience
09:30		Break	
09:45	Lecture 8.4	Prof J M Woodley	Bioprocesses for the production of chemicals
10.15	Lecture 8.5	Prof E N Pistikopoulos	Smart manufacturing & process intensification
10:45		Prof R Gani	Workshop summary & close

Presenters:

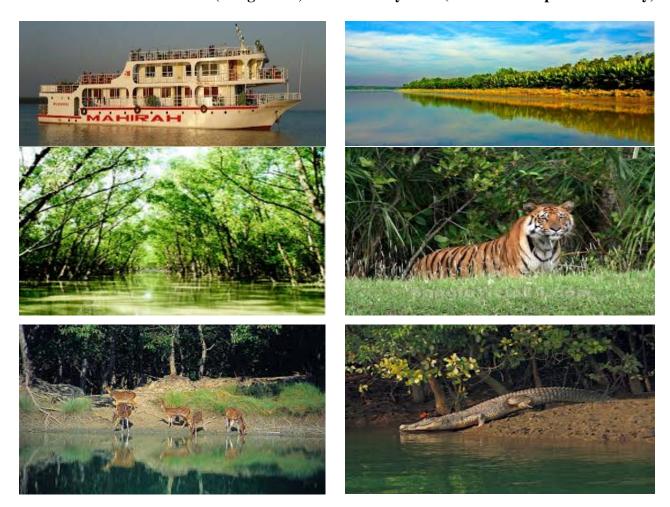|		Presentations
1. Prof LEK Achenie [achenie@vt.edu]	USA	2.3, 4.2
2. Prof S Assabumrungrat [suttichai.a@chula.ac.th]	Thailand	2.1
3. Prof X Chen [xi_chen@zju.edu.cn]	China	3.2
4. Prof MAAS Choudhury	Bangladesh	6.1
5. Prof M Eden [edenmar@auburn.edu]	DK-USA	1.2, 4.3
6. Prof F Friedler [friedler.ferenc@itk.PPKE.hu]	Hungary	1.6, 7.2
7. Prof R Gani [rag@kt.dtu.dk]	DK	2.4, 4.4, 6.2
8. Prof GG Gosalbez [g.guillen05@imperial.ac.uk]	Spain-UK	3, 3.4
9. Prof M Ierapetritou [marianth@soemail.rutgers.edu]	USA	1.3, 5.2
10. Prof MN Karim [nazkarim@mail.che.tamu.edu]	USA	6.4
11. Prof I Karimi [cheiak@nus.edu.sg]	Singapore	2.2, 6
12. Prof W Kiatkittipong [worapon@hotmail.com]	Thailand	3.1
13. Prof Z Kravanja [zdravko.kravanja@um.si]	Slovenia	7.3, 8.2
14. Prof JH Lee [jayhlee65@gmail.com]	Korea	5.3, 6, 8.1
15. Prof M Martin [mariano.m3@usal.es]	Spain	4, 4.1
16. Prof I Mujtaba [I.M.Mujtaba@bradford.ac.uk]	UK	2, 6.3, 7.1
17. Prof E Perez-Cisneros [espc@xanum.uam.mx]	Mexico	3.3
18. Prof EN Pistikopoulos [stratos@tamu.edu]	Greece-USA	1.1, 5.4, 7.4, 8.5
19. Prof A Póvoa [apovoa@tecnico.ulisboa.pt]	Portugal	1.5, 8.3
20. Prof R Srinivasan [raj@iitgn.ac.in]	India	
21. Prof J Woodley [jw@kt.dtu.dk]	UK-DK	7.5, 8.4
22. Prof F You [you.fengqi@gmail.com]	China-USA	1.4, 5, 5.1

21 biodata (1 per page) to be added

Participants

#	Name	Affiliation	Role
1.	Ms. Kaniz Fatema [kanizfatema@che.buet.ac.bd]	BUET	Faculty
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13.	Ms Rahatun Akter	SUST	Faculty
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38.	Mohammad Hasibul Hasan	MSc (BUET)	Student
39.	Jewel Hossain	MSc (BUET)	Student
40.	Mohammad Al-Amin	MSc (BUET)	Student
41.	Dr. Ijaz Hossain	BUET	Faculty/Head ChE
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43.	Mr. M Kamarujjaman Khan	SBK Trust	Organizer/Admin
44.	Mr. Raymond Mistry	SBK Trust	Organizer/Admin
45.	Shahrin Iqbal	SUST	Student/Guest
46.	Prof Lingyu Zhu [zhuly@zjut.edu.cn]	ZJUT(China)	Faculty/Guest
47.	Michael Gani	Denmark	Student/Guest

River Cruise to Sundarbans (Bangladesh): 2-5 February 2017 (after workshop social activity)

Itinerary

- **Day 01/02 Feb** (Dhaka-Sundarbans): Early in the morning at **07:00** am guests will be received at *Sultana Kamal Bridge, Demra*, Dhaka. Breakfast will be served soon after and the cruise vessel will start its journey towards the forest. On the way the beautiful riverine life, *hilsha* fishing, harvesting of crops on the shore, several types of country boat, etc., can be seen. The cruise will continue through Buriganga, Meghna, Kirtankhola, Baleshwary and Pashur rivers. The cruise vessel will stop at Barisal or Shupoti forest station. Overnight stay at Barishal or Shupoti.
- **Day 02/03 Feb** (Kachikhali): In the morning following the formalities at the Forest Department Station at Shupoti, the cruise will proceed towards *Kachikhali* (part of Sunderbans). A full day exploration at Kachikhali is arranged. It will be possible to hike through the wooden walk-way where it will be possible to see deer grazing around. Also, a boat ride will be organized in the evening. Depending on the tide schedule, the boat will begin the return journey at high tide. Overnight stay on board.
- **Day 03/04 Feb** (Chadpur): In the morning, the boat will continue the return journey with the high tide and cruise the whole day and night to arrive in Dhaka the next day in the morning. On the way, again, beautiful scenes, for example, the riverine life, green field, several types of country boats, can be observed and enjoyed during the peaceful cruise through Buriganga, Meghna, Kirtankhola and Baleshwary rivers. Overnight stay on onboard

- **Day 04/05 Feb** (Dhaka): The cruise vessel will arrive in Dhaka early in the morning (**05:00**), disembarking can take place after breakfast on board (optional).

Things to carry*
Torch / Towel / Umbrella / Raincoat / Binoculars / Suitable Clothes / Camera & Film / Mosquito repellent / Sun screen lotion / Walking shoes & Sandals / Swimming gear / Reading material / Board Games.
*Please carry minimum luggage

Meals
Breakfast: 1) Toast, Butter, Egg-omelet / fry, Jam, Sundarbans honey, tea & coffee, seasonal fruit; 2) Chapati, omelet, mixed vegetable, Sundarbans honey, tea & coffee, fresh fruit.

Snacks: Chanachur, Cake, Noodles, Vegetable Pakora, Biscuits.

Lunch: 1) Plain rice, mixed vegetable, thick dal (lintels), fish fry, salad, tea & coffee, dessert; 2) Plain polau, fried vegetable, chicken curry, salad, tea & coffee, dessert; 3) Khichuri, potato chop, fried vegetable, mutton curry, salad, tea & coffee, dessert.

Dinner: 1) Plain rice, vegetable chop, thick dal, fish or chicken curry, mixed vegetable, salad, tea & coffee, dessert; 2) Fried rice, French fry, boiled vegetable, chicken curry, salad, tea & coffee, dessert; 3) Noodle & fried rice, mixed vegetable, Bar-B-Q chicken & fish, salad, tea & coffee, dessert

Rules & Regulation
- Smoking is strictly prohibited in the cabin.
- Authority will not be liable for any accident, theft, loss or damages.
- You have to take care of your luggage.
- Littering is strictly prohibited in the river, shore and tourist spots.
- Making noise, annoying animal, injury to plantation are not allowed.

Safety Features
- 60 Life Jackets
- 20 Lifebuoys
- GPS (Global Positioning System)
- Echo Sounder (for Automatic Draft Measurement)
- First Aid Kit
- Wireless
- Fire Extinguisher
- VHF - Radio Communication System