

LUCS Summer School 2018

PROGRAM

Simula Metropolitan Center for Digital Engineering, The University of Oslo and
Technical University of Berlin welcome you to the

2018 Summer School on **Future Energy Information Networks (SS-FEIN)**

Oslo, Norway 3-7 Sept 2018

GENERAL INFORMATION

Required Equipment:

Laptop computer and power adaptors.

Project Assignment:

All students will be required to submit their project assignment within two weeks from the end of the summer school, i.e., by Sept. 21, 2018.

Contact person:

Prof. Sabita Maharjan – sabita@simula.no

Speakers are from the following institutes:

*Simula: Simula Metropolitan Center for Digital Engineering, Simula Research Laboratory and Oslo Metropolitan University, Norway

*UiO: University of Oslo, Norway

*IFI: Institutt for informatikk (Department of Informatics)

*IFE: Institutt for energiteknikk (Institute of Energy Technology)

*ITS: Institutt for teknologisystemer (Department of Technology Systems)

*NTNU: Norwegian University of Science and Technology, Trondheim, Norway

*TUB: Technical University of Berlin, Berlin, Germany

DNV-GL, Norway

SINTEF, Norway

FLIR Systems, Norway

Oslo, Norway 3-7 September, 2018
Simula Research Laboratory, Oslo

Monday September 3

LUCS SSFEIN 2018 Registration, Formal Opening and Course Introduction (08:15 – 10:00)

08:15 – 09:00: Registration and Coffee

09:00 – 09:15: Welcome speech and formal opening

09:15 – 10:00 Course Overview (Prof. Sabita Maharjan, Simula; Prof. Frank Eliassen, UiO)

- Overall course layout
- Introduction to Future Energy Information Networks

10:00 – 10:15: Coffee break

Morning session (10:15 – 13:00)

L1: **Dependability in interdependent systems-of-systems** (Prof. Poul Einar Hegaard, NTNU, Norway)

(1 or 2 coffee breaks)

- Network science perspective
- Taxonomy
- Modelling approaches
- Simulation approaches
- Smart Grid perspective
- Communication perspectives
- Use cases

13:00-14:00 - Lunch

Afternoon session (14:00 – 16:00)

L2: **Power Modeling and Characterisation for Data Centers** (industry Speaker: FLIR Systems, Dr. Kristoffer Robin Stokke)

(15:00-15:15 – Coffee Break)

- Subtopics : [Coming Soon!](#)

SOCIAL EVENT

Evening MONDAY, 3rd September (17:00): LUCS SS-FEIN 2018 Opening Dinner
Location: [Coming Soon!](#)

Tuesday September 4

Morning session (09:00-12:00)

L3: **Electric vehicles and vehicle to grid (V2G)** (Prof. Yan Zhang, IFI, UiO)
(1 or 2 coffee breaks)

- Definition and main concepts
- Power Management in V2G
- Blockchain for V2G

12:00-13:00 - Lunch

Afternoon session (13:00-17:00)

13:00 - 14:30: L4: **Socio-Economic Analysis of Energy Markets** (Prof. R. Golombek, UiO)

- Subtopics : [Coming Soon!](#)

14:30 – 14:45: Coffee break

14:45 – 17: 30: L5: **Energy Market and Game Theory for Smart Energy Systems** (Prof. Sabita Maharjan, Simula)

(1 or 2 coffee breaks)

- Demand Response Management
- Game theory: Definitions and key concepts
- Energy Market: Market dynamics, optimization and equilibrium
- Game theory for optimal market strategies

Wednesday September 5

Morning session (09:00-12:00)

L6: Topic: **Security of Supply in a Green Power Market** (Prof. Arne Lind, ITS, UiO)

(1 or 2 coffee breaks)

- Subtopics : [Coming Soon!](#)

12:00-13:00 - Lunch

Afternoon session (13:00-16:00)

13:00 – 14:15: L7: **Power based Markets vs. Energy based Markets** (Industry Speaker, DNV-GL, Norway)

- Opportunities in the energy market
- Who are the Players?
- End-consumers' (buyers) expectations vs. TSO/DSO's (sellers) expectations; Willingness to pay
- Flexibility vs. effective prices for shaving power peaks
- Framework necessary for the development of energy markets

14:15 – 14:30: Coffee break

14:30 – 17:30: L8: **Blockchain for Smart Energy Systems** (Prof. Roman Vitenberg, IFI, UiO)

(1 or 2 coffee breaks)

- Concepts and background
- Bitcoin mechanisms in depth
- Advanced blockchain systems (Ethereum and Hyperledger)
- Hands-on tutorial on developing smart contracts in Ethereum

Thursday September 6

Morning session (09:00-12:00)

L9: **Deep learning for future energy systems** (Dr. Michael Rieglar, Simula)

(1 or 2 coffee breaks)

- Introduction to deep learning
- Requirements and challenges of data analysis for future energy systems
- Deep learning by example: Smart EV scheduling

12:00-13:00 – Lunch

Afternoon session (13:00-17:00)

13:00 – 16:00: L10: **Solar Energy** (Prof E. Marstein, IFE)

(1 or 2 coffee breaks)

- Subtopics : [Coming Soon!](#)

16:00 - 16:15: Coffee break

16:15 – 17:30: L11: **Smart Grid Security from the IoT and Software Engineering perspectives**

(Dr. Phu Nyugen, SINTEF)

- Smart Grid Security from the IoT perspective
- Deployment and orchestration approaches for trustworthy smart distributed systems
- Model-Based Security Testing for Advanced Metering Infrastructure.

Friday September 7

Morning session (09:00-12:00)

- Demo: A functional microgrid testbed across five villages in Germany (Dr. Thomas Huhn, TU Berlin, Germany)
- MONROE (Measuring Mobile Broadband Networks in Europe) Demo (Dr. Isabel Sanchez, Simula)
- Poster session: Simula/UiO PhD students

12:00-13:00 - Lunch

Afternoon session (13:00-15:45)

Work on the Project from L9 (Dr. Rieglar will be available for help)

15:30-15:45: Summer School Wrap Up (Prof. Sabita Maharjan, Simula)

The school will finish at 15:45 on Friday September 7. Please contact us if you will need to leave earlier, and keep in mind the final dinner on Sept 6.

SOCIAL EVENT

Evening THURSDAY, September 6, 19:00: LUCS SSFEIN 2018 Closing
Dinner Location: (downtown Oslo)