JM Burgers Center Course

CAPILLARITY-DRIVEN FLOWS IN MICROFLUIDICS

15-19 April 2013 / De Lutte / Twente

Wetting and interfacial tensions play a crucial role for the behavior of fluids on length scales below the capillary length, which is typically of order 1mm. Typical application areas include well-established traditional fields such as coating technology, emulsification and oil recovery as well as recent fields such as microfluidic systems, inkjet printing technology, and immersion lithography.

The course will cover the basic theoretical models used to describe thin film flows in coating, wetting, and dewetting flows. Topics addressed during the course include wetting of patterned surfaces, superhydrophobic surfaces, contact line dynamics, theory of thin film (lubrication) flows, surface-stress driven flows, (Marangoni, thermocapillarity, electro-wetting), two-phase flow micro-fluidics, drop generation.

Next to approximately 20 lectures with a nominal duration of 45min, the program also contains ample time for discussions in the form of tutorial and in extended case studies for the evening program. Friday morning is reserved to the presentation of the results of the cases by the participants of the course.

LOCATION:

Hotel de Grote Zwaan / De Lutte

Fletcher Hotel De Grote Zwaan
Bentheimerstraat 21
7587 NV DE LUTTE
T: 0347 – 750421
(www.hoteldegrotezwaan.nl)

A number of hotel rooms have been reserved at the hotel. The hotel can be reached from train station Oldenzaal within 10min using a local bus.

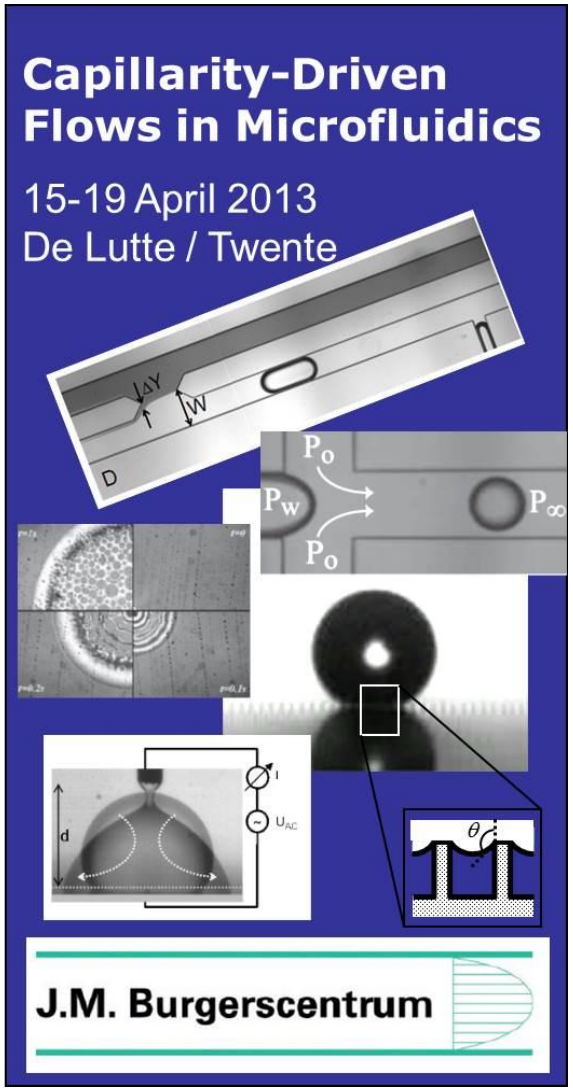
COURSE FEE:

The course fee for Ph.D. students from registered JMBC groups is 250€, which includes course materials, lunch, course dinner and accommodation.

For non-JMBC PhD students, the fee is 150€, but without reimbursement for the accommodation.

REGISTRATION:

Registration is only possible by filling in the hard copy registration form (given in JMBC course guide) and sending it back to the JMBC secretariat or by online registration (http://www.jmburgerscentrum.nl/formulier/6/JMBC-PhD-Course.htm).



COURSE PROGRAM

Monday:
12:00 – 13:00h registration + lunch
13:00h welcome: Frieder Mugele
13:00h Frieder Mugele: *Wetting basics*
14:00h Jacco Snoeijer: *Surface tension: thermodynamics and microscopics*
15:30h Jacco Snoeijer: *Wetting: thermodynamics and microscopics*
16:30h Frieder Mugele: *Lubrication flows*
18:00h dinner
19:30h presentation of cases
20:30h work on cases (with lecturers)

Tuesday:
9:00h Jacco Snoeijer: *Contact line dynamics*
10:00h Michiel Kreutzer: *Two-phase flow in microchannels I*
11:15h Michiel Kreutzer: *Two-phase flow in microchannels II*
12:00h lunch
14:00h tutorial & discussion *asymptotic matching & Landau-Levich films*
15:00h Frieder Mugele: *Wetting of heterogeneous surfaces*
16:15h Frieder Mugele: *Superhydrophobic surfaces*
17:15h Anton Darhuber: *Non-coalescence of drops*
18:30h workshop dinner
20:30h working classes

Wednesday:
9:00h Frieder Mugele: *Physical principles of electrowetting*
10:00h Frieder Mugele: *Applications of electrowetting*
11:15h Anton Darhuber: *Surface tension gradient driven flows*

12:15h lunch

14:00-18:00h Jacco Snoeijer & Michiel Kreutzer: *Self-similarity & asymptotic matching & examples*

19:30h dinner & free case work

Thursday:
9:00h Jacco Snoeijer: *Force and energy balance arguments in wetting*
10:00h Michiel Kreutzer: *Drop generation*
11:15h Michiel Kreutzer:*Drop gener. II*
12:00h Lunch
16:00h tutorial & discussion *drop generation*
14:00h Anton Darhuber: *Thermocapillary flows*
15:00h Anton Darhuber: *Surfactant-driven and solutocapillary flows*
16:00h tutorial & discussion *Marangoni flows*

18:15h dinner
20:30h preparation final presentations

Friday:
9:00h participant presentations of case studies (15min + 10min discussion per group)
12:00h closure
12:15h lunch

(Minor changes in the program may apply.)

ADDITIONAL INFORMATION
will be available at
http://www.utwente.nl/tnw/pcf/education

or directly from:
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