



Symposium Programme

14th Fundamental Research Symposium

St. Anne's College, Oxford

13-18 September 2009

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Monday September 14

08:50 START

Welcome from the Chair of the Fundamental Research Committee

Keynote address

Professor Fritz Vollrath, Department of Zoology, Oxford University.

Session 1: Fibre Preparation

SESSION CHAIR: WARREN BATCHELOR

1. Novel fractionation methods: separation in a viscoplastic fluid.
A. Madani, S. Storey, J.A. Olson, I.A. Frigaard, D.M. Martinez, *University of British Columbia, Canada*; J. Salmela, *VTT, Finland*.
2. The net normal force per crossing point: A unified concept for the low consistency refining of pulp suspensions.
J.C. Roux, J.-F. Bloch, R. Bordin and P. Nortier. *Laboratoire de Génie des Procédés Papetiers, France*.

10:45 – 11:15: COFFEE

3. Simulation of surfactant contribution to ink removal selectivity in flotation deinking lines.
D. Beneventi, J.Allix, P. Nortier, *Laboratoire de Génie des Procédés Papetiers, France*; E. Zeno and B. Carré, *CTP, France*.
4. **Review:** Biochemical additives for papermaking.
J.J. Pawlak, *North Carolina State University, USA*.

12:30 – 13:45 LUNCH

Session 2: Fibre Suspensions and Forming

SESSION CHAIR: ARI KIVIRANTA

5. New experimental results on the flow regimes in closed channel flows of wood fibre suspensions.
A. Jäsberg, M. Kataja, *University of Jyväskylä, Finland*; P. Raiskinmäki, *Jyväskylä University of Applied Science, Finland*.
6. Near-wall estimates of the concentration and orientation distribution of a semi-dilute rigid fiber suspensions in Poiseuille flow.
P. Krochak, J.A. Olson and D.M. Martinez, *University of British Columbia, Canada*.

15:00 – 15:30 COFFEE

7. Evolution of the paper structure along the length of a twin-wire former.
S.B. Lindström, T. Uesaka, *Mid Sweden University*; U. Hirn, *Graz University of Technology*.
- 7a. Response to 'Evolution of the paper structure along the length of a twin-wire former'
D. Söderberg, *Innventia, Sweden*.
8. Single fibre flexibility measurement in a flow cell based device.
R. Eckhart, M. Donoser and W. Bauer, *Graz University of Technology, Austria*.

17:00 CLOSE

Tuesday September 15

09:00 START

SESSION CHAIR: NORAYR GURNAGUL

9. **Review:** Optical properties of paper: theory and practice
P.R. Farnood, *University of Toronto, Canada*.

Session 3: Transport and moisture interactions

10. The influence of grammage, moisture content, fibre furnish and chemical modifications on the hygro- and hydro-expansion of paper
P.A. Larsson, L. Wågberg, *KTH Royal Institute of Technology, Sweden*; M. Hoc, *Innventia, Sweden*.
11. On the importance of in-plane shrinkage and through-thickness moisture gradient during drying on cockling and curling phenomena
P. Lipponen, T. Leppänen, J. Hämäläinen, *University of Kuopio, Finland*;
A.-L. Erkkilä, *Metso Paper, Finland*.

10:45 – 11:15: COFFEE

12. Flow permeability of fibrous porous materials. Micro-tomography and numerical simulations
V. Koivu, K. Mattila, J. Alaraudonjoki, M. Kataja, *University of Jyväskylä, Finland*; M. Decain, J.-F. Bloch, *Laboratoire de Génie des Procédés Papetiers, France*;
C. Geindreau, *University of Grenoble, France*.
13. Multiscale moisture transport in paper: Impact of pore and fibre tortuosity and anisotropy.
Y. Defrenne, S. Ramaswamy, V. Goel, A. Gupta, Y. Zhdankin, *University of Minnesota, USA*; S. Lavrykov and B.V. Ramarao, *SUNY, USA*.

12:30 – 13:45 LUNCH

SESSION CHAIR: WILLIAM SAMPSON

14. A simple model of the air permeability of paper.
P. Shallhorn and N. Gurnagul, *FPIInnovations—Paprican, Canada*.
15. A laboratory investigation into the origin of machine direction microstriations.
M.F.C. Lucisano and H. Vomhoff, *Innventia, Sweden*.

15:00 – 15:30 COFFEE

Fundamental Research Communications (POSTERS)

An introductory overview of work presented in posters will be provided in a series of brief presentations, after which delegates will break to view and discuss the posters over a glass of wine. A list of poster presentations is available at www.frc14oxford2009.org.uk.

Wednesday September 16

08:45 START

Session 4: Running Webs

SESSION CHAIR: ANDERS ÅSTRÖM

16. Instability of webs: The prediction of troughs and wrinkles.
J.K. Good, J.A. Beisel, H. Yurtcu, *Oklahoma State University, USA*.
17. System stability of the open draw section and paper machine runnability.
S. Edvardsson, *Mid Sweden University, Sweden*; T. Uesaka, *FPIInnovations—Paprican, Canada*
18. Wet web rheology on a paper machine.
A. Tanaka, J. Asikainen, J.A. Ketoja, *KCL Science and Consulting, Finland*.

10:30 – 11:00 COFFEE

Session 5: Structure and analysis

SESSION CHAIR: DANIEL SÖDERBERG

19. **Review:** Three-dimensional structural analysis.
J.-F. Bloch, S. Rolland du Roscoat, *Laboratoire de Génie des Procédés Papetiers, France*.
20. Structural invariance of stochastic fibrous networks.
C.T.J. Dodson, W.W. Sampson, *University of Manchester, UK*.

12:15 – 13:15 LUNCH

21. Spatial partitioning of the structural properties of tissue and towel grades.
D.S. Keller, *Miami University, USA*; D. Branca and O. Kwon, *SUNY, USA*.
22. Introducing a concept to link 3D paper structure to 2D paper properties.
U. Hirn, M. Donoser, J. Kritzingner, W. Bauer, *Graz University of Technology, Austria*.

14:30 CLOSE

Thursday September 17

09:00 START

SESSION CHAIR: WOLFGANG BAUER

23. **Review:** The surface analysis of paper
J. Preston, *Imerys, UK*.

Session 6: Mechanical Properties

24. Developing a deeper understanding of the constitutive behaviour of paper.
D.W. Coffin, *Miami University, USA*.
25. Development of the notched shear test.
M. Nygårds, *S. Östlund, KTH, Sweden*; *C. Fellers, Innventia, Sweden*.

10:45 – 11:15: COFFEE

26. The influence of microfibrillated cellulose, MFC, on paper strength and surface properties.
K. Syverud, *G. Chinga-Carrasco, Ø. Eriksen, PFI, Norway*; *Ø. Gregersen, Norwegian University of Science and Technology, Norway*.
27. The effect of fibre orientation on the zero-span testing of paper.
S. Dowlatshahi, M.T. Kortschof, University of Toronto, Canada.

12:30 – 13:45 LUNCH

SESSION CHAIR: GARY BAUM

28. **Review:** Degradation phenomenology and life modelling of paper—a review.
H. Ding, *Doble PowerTest, UK*
29. On the mechanisms of mechano-sorptive creep reduction by chemical cross-linking.
M. Gimåker, *L. Wågberg, KTH, Sweden*; *A.-M. Olsson, L. Salmén, Innventia, Sweden*.

15:00 – 15:30 COFFEE

30. Effects of furnish related factors on tension and relaxation of wet webs.
E. Retulainen and *K. Salminen, VTT, Finland*.
31. Prediction of fibre orientation and stiffness distributions in paper – an engineering approach.
T. Wahlström, *Stora Enso, Sweden*.
32. Effect of drying conditions on the tensile properties of paper.
P. Mäkelä, *Innventia, Sweden*.

17:15 CLOSE

Friday September 18

09:00 START

SESSION CHAIR: JOHN ROBERTS

33. **Review:** Bioactive paper – a low cost platform for diagnostics.
R. Pelton, *McMaster University, Canada*.

Session 7: Chemistry

34. Bioactive enzymatic papers.
W. Shen, M.S. Khan, J. Tian, L. Xu, G. Garnier, Monash University, Australia.
35. Adhesive and long-range capillary forces between hydrophobic surfaces in water: effects of surface topography.
V. Wallqvist, *P.M. Claesson, A. Swerin, Institute for Surface Chemistry, Sweden*; *C. Östlund, Innventia, Sweden*; *J. Schoelkopf, P. Gane, Omya Development, Switzerland*.

10:45 – 11:15: COFFEE

36. The structure and strength of flocs of precipitated calcium carbonate induced by various polymers used in papermaking.
R. Gaudreault, *N. Di Cesare, Cascades Inc., Canada*; *T.G.M. van de Ven, McGill University, Canada*; *D. Weitz, Harvard University, USA*.
37. On fundamentals and applications of superhydrophobicity in papermaking and packaging.
A. Swerin, *Institute for Surface Chemistry, Sweden*.

12:30 – 13:45 LUNCH

Session 8: Coating and Printing

SESSION CHAIR: PATRICE MANGIN

38. A structural analysis of the thermal conductivity of paper coatings: Application of particle deposition simulation to a lumped parameter model.
P. Gerstner, *J. Paltakari, Helsinki University of Technology, Finland*; *C.J. Ridgeway, P.A.C. Gane, Omya Development, Switzerland*.
39. Probabilistic analysis of small-scale print defects with aligned 2D measurements.
M. Mettänen, *M. Lauri, R. Ritala, Tampere University of Technology, Finland*; *U. Hirn, Graz University of Technology, Austria*.
40. Fundamental studies of linting in offset printing of newsprint.
W.J. Batchelor, *A. Sudarno, C. Gujjari, Monash University, Australia*; *P. Banham, Norske Skog, Australia*.

CLOSING REMARKS

S.J. l'Anson, FRC Chairman

15:30 SYMPOSIUM CLOSE AND COFFEE