

*soft*EXTRUSION 2004

Workshop

National Science Foundation, NSF
Luso-American Development Foundation, FLAD

October 14-18,

Hotel D. João II, Alvor (Algarve) PORTUGAL

Programme & Abstracts

SCIENTIFIC PROGRAMME

<p><i>Thursday</i> October 14th P.M.</p>	15:00-17:45	Registration
		<i>Coffee</i>
	17:45-17:55	Welcome (<i>C. Buchanan</i>)
	17:55-18:05	Presentation of the programme (<i>J. A. Covas</i>)
	18:05-18:25	NSF Partnership for innovation (<i>C. Hill-Herndon</i>)
	18:25-19:00	Innovation and technology transfer (<i>C. Bernardo/J. Kennedy</i>)
		<i>Dinner</i>
<p><i>Friday</i> October 15th A.M.</p>		State-of-the-art on extruder modeling
	09:00-09:50	Fundamentals of polymer melt flow in single screw extruders - from analytical modeling to computer simulations (<i>Ica Manas Zloczower, Case Western Reserve University, USA</i>)
	09:50-10:40	Modeling and simulation of plasticating single screw extrusion, state of the art and remaining challenges (<i>C. Rauwendaal, Rauwendaal Extrusion Engineering, USA</i>)
		<i>Coffee break</i>
	11:00-11:50	Modeling of flow and chemistry in twin screw extruders (<i>B. Vergnes, Cemef, France</i>)
	11:50-12:40	Modeling of polymer flow in forming tools (<i>J. M. Nóbrega, University of Minho, Portugal</i>)
		<i>Lunch</i>
<p><i>Friday</i> October 15th P.M.</p>	14:30-15:20	Quantitative analysis of mixing in extrusion processes (<i>Ica Manas Zloczower, Case Western Reserve University, USA</i>)
	15:20-16:10	Stress, velocity and temperature field measurements in polymer melt flows (<i>P. D. Coates, University of Bradford, UK</i>)
		<i>Coffee break</i>
	16:30-17:20	Optimization-based design of extruders (<i>J. A. Covas, University of Minho, Portugal</i>)
	17:20-18:10	Recent developments in die design (<i>O. S. Carneiro, University of Minho, Portugal</i>)
		<i>Dinner</i>
	21:00-22:30	POSTER SESSION

Saturday October 16 th A.M.	09:00-09:50	Numerical methods for modeling fiber and film formation (<i>S.D. Phillips, Massachusetts Institute of Technology, USA</i>)
	09:50-10:40	Real-time monitoring of microstructure during film processing (<i>A. Ogale, Clemson University, USA</i>)
	Coffee break	
	11:00-11:50	Modeling flow-enhanced crystallization in fiber spinning and film blowing (<i>A. McHugh, Lehigh University, USA</i>)
	11:50-12:40	Molecular simulation of polymer crystallization during processing (<i>R. Rutledge, Massachusetts Institute of Technology, USA</i>)
	Lunch	
Monday October 18 th A.M.	Presentation of modeling packages	
	09:00-09:30	BEMflow (<i>C. Rauwendaal, Rauwendaal Extrusion Engineering, USA</i>)
	09:30-10:00	Polyflow - Getting the right balance in extrusion (<i>T. Marchal, Fluent Benelux, Belgium</i>)
	10:00-10:30	Presentation of Ludovic [®] software (<i>B. Vergnes, Cemef, France</i>)
	Coffee break	
	10:50-11:40	ITXtrude, REEflow (<i>C. Rauwendaal, Rauwendaal Extrusion Engineering, USA</i>)
	11:40-12:10	FISIM (<i>C. Cox, Clemson University, USA</i>)
12:10-12:40	Flow 2000 (<i>J. Perdikoulis, COMPUPLAST, USA</i>)	
	Lunch	
Monday October 18 th P.M.	Successful application of software to solve industrial problems	
	14:30-16:10	<i>C. Rauwendaal, Rauwendaal Extrusion Engineering, USA</i> <i>T. Marchal, Fluent Benelux, Belgium</i> <i>J. Perdikoulis, COMPUPLAST, USA</i>
	Coffee break	
	16:30-18:00	Discussion Panel: the requirements for the optimal use of modelling packages (<i>software providers, lecturers, participants</i>)
	18:00-18:10	Closure (<i>C. Bernardo / J. Kennedy</i>)
	Dinner	

Modeling the cooling stage: The influence of geometrical and operating parameters

J. M. Nóbrega⁽¹⁾, O. S. Carneiro⁽¹⁾, J. A. Covas⁽¹⁾, P. J. Oliveira⁽²⁾, F. T. Pinho⁽³⁾

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A 3D numerical code, based on the finite volume method, able to model the cooling stage of an extrusion line is used for investigating the effect of various process and geometrical parameters onto the efficiency of calibration/cooling units. The code is able to tackle accurately various practical situations such as the presence of several individual cooling units, the presence of complex cooling channels layouts and the existence of a thermal resistance between the plastic profile and the cooling medium.

The effect of process and geometrical parameters on the cooling performance can be quite distinct. Often, when a reduction of the profile average temperature is imparted, lower temperature homogeneity is also obtained. The only exceptions are variations in the extrusion velocity and splitting the calibrator into several units.

Network Application Security Architecture

T. Shelling

CAEFF, Clemson University, 301 Rhodes Engineering Research Center, Clemson, 29634, USA

CAEFF's Integrated Model application will incorporate a Relational Database Management System (RDBMS). Application users will use this RDBMS to import into the application the rheological data, constraints, and attributes for selected polymers. Users will also use this RDBMS to maintain the associated data for the polymers, track simulation results for a given polymer, or create new polymer entries. The Center is developing a separate application to allow registered users, partners, and researchers the ability to add new polymers and maintain existing polymer entries. The polymer database management tool (PDMT) will run on a UNIX workstation in a wide variety of corporate, academic, and even home computer networks and will need to connect to the RDBMS, maintained by the Center at its computing facilities. This poster describes how the PDMT will connect to the RDBMS to ensure interoperability across a wide range of academic, corporate, and personal computer networks. It will also describe the architecture used by the Center in building its applications and tools to meet the various challenges in computer and network security, customer privacy, and data integrity.

Examples of CAEFF-Industry Interaction

C. Cox

CAEFF, Clemson University, 301 Rhodes Engineering Research Center, Clemson, 29634, USA

Interactions between CAEFF and industry take several forms, including directed (proprietary) research projects, short-term summer projects suitable for teams of undergraduates and honors high school students, student internships, and sabbaticals. Typically, these collaborations involve experimental characterization, simulation, and experimental verification. Highlights of five representative industry projects will be presented, along with a brief description of polymer characterization and on-line measurement equipment available at CAEFF.