

Sunday Networking Session (4:00 PM)

At this year's Networking Session ISCST will welcome individuals from a number of leading companies seeking future employees. Each of these representatives will deliver a brief, informative talk on their company, its operations, benefits and career paths. Following those talks, attendees will have a chance to meet with each representative to discuss career goals and future employment opportunities. Refreshments are included during this Session.

Reception (Sunday evening) The opening reception will be held at the Science Museum of Minnesota, which is three blocks from the conference hotel. In addition to enjoying food and socializing, participants will have exclusive access to all the exhibits, and the Omni Max Theater.

Monday**Special Technical Session 1:****Coating And Printing Challenges In The Energy Industries**

- 8:00 AM Welcome
- 8:15 AM **The Role Of Processing On The Development Of High Performance Solid Oxide Fuel Cells**
B. Borglum,
Versa Power Systems
- 8:45 AM **Fluorinated Membranes For Proton Exchange Membrane Fuel Cells**
S. Hamrock,
3M Fuel Cell Components Program
- 9:15 AM **Use Of Solution Processing For Reduced Cost Photovoltaics**
M. Van Hest,
National Renewable Energy Lab
- 9:45 AM Break
- 10:15 AM **Recent Progress In Plastic Solar Cell Technology - Opportunities And Challenges For The Coating Industry**
G. Li,
Solamer
- 10:45 AM **Upscaling New Battery Technologies From Lab To Fab**
T. Kolbusch,
Coatema Coating Machinery GmbH
- 11:15 AM **Window Films For Energy Conservation: Design And Production Challenges!**
R. Padiyath, G. F. King,
3M Company
- 11:35 AM **Crack Mitigation In PEMFC Electrode Layers**
R. Koestner,
General Motors Fuel Cell Activities
- 12:00 M Lunch, Tallmadge Award

- 4:30 PM **DNS Of 2D Disturbed Air Flow With Leveling Process**

T. Tsuda,
Dai Nippon Printing Co., Ltd.

Technical Session 2: Nanomaterial And Nanoscale Coatings

- 1:30 PM **Gas Barrier And Anti-flammability Of Thin Nano Brick Wall Coatings**
J. C. Grunlan, M. A. Priolo, Y. C. Li,
Texas A&M University
- 1:50 PM **Coating And Drying Of Hybrid Solar Cells**
L. Wengeler, B. Schmidt-Hansberg, K. Peters, F. Brunner, K. Doering,
Karlsruhe Institute Of Technology; F. Rauscher, P. Niyamakom, *Bayer Technology Services GmbH*; P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*
- 2:10 PM **Layered Nanostructures For Enhanced Light Harvesting In Dye-Sensitized Solar Cells**
B. Liu, E. S. Aydil,
University Of Minnesota
- 2:30 PM **Transparent And Highly Conductive Carbon Nanotube Thin Films**
Y. T. Park, A. Ham, J. Grunlan,
Texas A&M University
- 2:50 PM Break
- 3:10 PM **Clay Nanotube Protective Coating With Controlled Release Of Healing Agents**
Y. Lvov,
Louisiana Tech University
- 3:30 PM **Thermoelectric Polymer Nanocomposites**
G. Moriarty, Z. Levin, ; J. C. Grunlan,
Texas A&M University
- 3:50 PM **Nanoscale Patterning Of Polyelectrolyte Multilayers With Wet Stamping**
C. Cho, N. S. Zacharia,
Texas A&M University
- 4:10 PM **Multiscale Model Development Of Pattern Nano-imprinting Processes**
S.A. Roberts, P.R. Schunk,
Sandia National Laboratories
- 4:30 PM **Multifunctional Block Polymer Thin Films For Templating And Separations**
M. Hillmyer,
University Of Minnesota
- 4:50 - 6:30 PM **Poster Session**

Monday Parallel Sessions**Technical Session 1: Coating Application Processes**

- 1:30 PM **Flow Limits In Single Layer Tensioned-web Coating: Numerical And Experimental Analyses**
J. Nam, University Of Minnesota; M. Carvalho,
Pontificia Universidade Catolica Do Rio De Janeiro
- 1:50 PM **Two-layer Tensioned-web-over-slot Die Coating: Effect Of Operating Conditions And Die Lip Design**
J. Nam, University Of Minnesota; M. Carvalho,
Pontificia Universidade Catolica Do Rio De Janeiro
- 2:10 PM **Coatability Of Viscoelastic Liquid Curtain**
G. Gugler, R. Beer, M. Mauron,
Ilford Imaging Switzerland GmbH
- 2:30 PM **Adjusting The Coating Gap And Vacuum Level To Minimize Periodical Thickness Variation On The Slot Coating Process**
E. B. Perez, 3M Do Brasil; M. S. Carvalho,
Puc-rio De Janeiro
- 2:50 PM Break
- 3:10 PM **R2R Processing Of Flexible Organic Light Emitting Diode Devices And Organic Photovoltaic Modules**
I. De Vries, S. Harkema, M. Ren, A. Langen, R. Andriessen, T. Van Mol, Holst Centre; D. Bollen,
Agfa
- 3:30 PM **Surface Energy Patterning For Continuous Coating Processes: A Route To High Throughput Organic Lighting And Signage Devices**
J. Gabel, C. Kjellander, I. De Vries, Holst Centre; B. Brasjen, A. Darhuber, Tu Eindhoven; P. Blom, Innophysics B.V.; R. Andriessen,
Holst Centre
- 3:50 PM **The Mechanics Of Web Release From A Roll During Size Press Operation**
D. Bousfield,
University Of Maine
- 4:10 PM **Numerical Simulation Of Multiple-impinging Slot Jets In Air Knife Coating**
P. Tamadonfar, *McMaster University*; A. Hrymak, *University Of Western Ontario*; J. Mcdermid, *McMaster University*; F. Goodwin, *International Zinc Association*

Tuesday**Special Technical Session 2:****The Processing And Science Of Biomedical Coatings**

- 8:10 AM Introductory Comments
- 8:15 AM **Microstructure Modeling Of Controlled Release Drug Coatings**
D. Saylor,
Food And Drug Administration
- 8:45 AM **Hydrophilic Coatings For Medical Devices**
P. Wyman,
DSM Biomedical
- 9:15 AM **Biomimetic Coatings For Biomedical Application**
B. Lee,
Nerites Corporation
- 9:45 AM Break
- 10:15 AM **Amphiphilic Silicone Coatings For Enhanced Blood Compatibility**
M. Grunlan,
Texas A & M University
- 10:45 AM **Advantages Of Ultrasonic Spray Coatings Of Biomaterials Onto Devices And Implantables**
R. Engle,
Sono-tek
- 11:15 AM **Computational Modeling Of Biomedical Coating Processes**
B. Forsyth, T. Schauer,
Boston Scientific

12:00 M Lunch, L. E. Scriven Young Investigator Award

1:30 - 2:30 PM Poster Session

Tuesday Parallel Sessions

Technical Session 3: Printing, Patterning And Discrete Object Coating

- 2:30 PM **Multichannel Development For The Air-bubble Coating**
I.C. Lin, A.B. Wang, G.W. Wu, W.P. Shih,
National Taiwan University
- 2:50 PM **The Effect Of Air Bubbles On Liquid Transfer During Printing**
S. Dodds, University Of Minnesota; M. Carvalho, *Pontificia Universidade Catolica Do Rio De Janeiro*; S. Kumar, *University Of Minnesota*
- 3:10 PM **Shear-induced Suppression Of Rupture In Thin Liquid Films With Application To Lithographic Printing**
S. Kalpathy, Satish Kumar, Lorraine F. Francis,
University Of Minnesota
- 3:30 PM **Dynamics Of Discontinuous Coating And Drying Of Nanoparticulate Films**
K. Tjiptowidjojo, S. Xiong, D.R. Dunphy, *University Of New Mexico*;
C.J. Brinker, P.R. Schunk, *Sandia National Laboratories*
- 3:50 PM Break
- 4:10 PM **Coating And Stability Of Thin Liquid Films On Chemically Patterned Surfaces**
B.J. Brasjen, A.A. Darhuber,
Eindhoven University Of Technology
- 4:30 PM **Atomization To Appearance In Electrostatic Rotating Bell Coating Application**
S. K. Basu, R. Davis, S. Hochstetler, C. Williams, J. Moncier, K. McCreight,
Eastman Chemical Company
- 4:50 PM **Coating Process Of Photosensitive Cylinders**
D. Quinonez, M. Carvalho, *Pontificia Universidade Catolica Do Rio De Janeiro*;
S. Kumar, *University Of Minnesota*
- 5:10 PM **Modeling Dynamic Contact Line Motion For Partially-wetting Systems**
L. Schwartz,
University Of Delaware
- 5:30 PM **Locating Jumps In The Film On A Partially Submerged Rotating Disk**
F. Miguel Joos,
Corning Incorporated

Technical Session 4: Drying And Solidification

- 2:30 PM **Influence Of Additives On The Diffusion Of Solvents In Polymer Coatings**
M. Muller, *Roche Diagnostics*; P. Scharfer, W. Schabel,
Karlsruhe Institute Of Technology
- 2:50 PM **A Critical Comparison Of Diffusion Coefficient Measurements In Polymer-solvent Systems Measured By Means Of Gravimetric Sorption Experiments And Spectroscopic Methods**
K. Peters, P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*
- 3:10 PM **In-situ Measurement Of The Formation Of Conductive Organic Thin Films During Solvent Evaporation**
K. Oku, S. Inasawa, Y. Tsuji, Y. Yamaguchi,
The University Of Tokyo
- 3:30 PM **In-situ Monitoring The Film Formation Of Solution Cast Polymer-Fullerene Blends For Organic Solar Cells**
B. Schmidt-Hansberg, B. Brenneis, M. Klein, *Karlsruhe Institute Of Technology*;
M. Sanyal, *Max-Planck-Institute Of Metals Research, Stuttgart*;
C. Walsh, *Sopralab, Courbevoie*; A. Colsmann, U. Lemmer, *Karlsruhe Institute Of Technology*; E. Barrena, *Max-Planck-Institute Of Metals Research, Stuttgart*;
P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*
- 3:50 PM Break
- 4:10 PM **Solvent Diffusion In Semicrystalline Polymer Films - An Experimental And Numerical Study**
S. Jeck, P. Scharfer, W. Schabel, M. Kind,
Karlsruhe Institute Of Technology
- 4:30 PM **Origin Of Residual Stress And Ways To Reduce It In Solvent Cast Polymer Film**
R. Katsumata, S. Ata, K. Kuboyama, T. Ougizawa,
Tokyo Institute Of Technology
- 4:50 PM **Investigation Of The Viscosity Related Defects And The Degree Of Solidification Of Coatings Using Microrheometry**
J.-O. Song, L. F. Francis,
University Of Minnesota
- 5:10 PM **Gloss Dynamics Of Inks On Porous Surfaces**
D. Bousfield,
University Of Maine

- 5:30 PM **Viscosity Control Of Light-emitting Polymer Inks For Large Area OLED Processing**
J.J. Michels, S.H.P.M. De Winter, J. Sweelssen, B.K.C. Kjellander, *Holst Centre*; A. Lüdemann, *Merck Kgaa*; M. Severens,
L. Bouwkamp-wijnoltz, *Philips Mds*

Wednesday Parallel Sessions

Technical Session 5: Flow And Drying Of Particulate Coatings

- 8:30 AM **Coating Die Design For Suspensions**
T. J. Liu, Y. Y. Lin,
Department Of Chemical Engineering National Tsing Hua University; T. C. Hsu,
TK Bond Llc
- 8:50 AM **A Fully Implicit - Fully Coupled Approach To Study Liquid Flows With Suspended Particles Using Lagrange Multipliers**
M. Lage, H. Lopes, M. Carvalho,
Pontificia Universidade Catolica Do Rio De Janeiro
- 9:10 AM **Leveling Of Thin Films Of Colloidal Suspensions**
B. Tsai, M. S. Carvalho, Puc-rio; S. Kumar, *University Of Minnesota*
- 9:30 AM **Flow And Drying Simulation Of Nanoparticle Suspension On Substrate**
M. Fujita, O. Koike, Y. Yamaguchi,
The University Of Tokyo
- 9:50 AM Break
- 10:10 AM **Flow Coating Ellipsoidal Titania Nanoparticles Into Films With Controlled Thickness And Structure**
M. Mittal, R. Niles, E. M. Furst,
University Of Delaware
- 10:30 AM **Drying Phenomena During The Formation Of Particulate Films From Colloidal Suspension**
S. Inasawa, Y. Yamaguchi,
The University Of Tokyo
- 10:50 AM **Drying Of Thin Liquid Films On Chemically Patterned Surfaces**
J.A. Vieyra, A.A. Darhuber, *Eindhoven University Of Technology*
- 11:10 AM **The Role Of Polymer In Dispersion Stability And Film Formation Of Silicapva Suspension**
S. Kim, J.H. Sung, K.H. Ahn, S.J. Lee,
Seoul National University

Technical Session 6: Wetting

- 8:30 AM **Intrinsic Contact Angle Hysteresis**
E. Diaz Martin, *Universidad De Salamanca*; M. Savage, *University Of Leeds*; R. Cerro, *University Of Alabama In Huntsville*
- 8:50 AM **Delaying Wetting Failure In Coating Flows Via Meniscus Confinement**
E. A. Vandre, S. Kumar, *University Of Minnesota*;
M. S. Carvalho, *Puc-rio*
- 9:10 AM **Substrate Scratches And Their Effect On Air Entrainment In Curtain Coating**
H. Benkreira, *University Of Bradford, Uk*; J. Rousseau, *University Of Bradford And Ocp, Stc Corus Rd&T, Rotherham S60 3Ar, Uk*;
M. Cosgrove, *Ocp, Stc Corus Rd&T, Rotherham S60 3Ar, Uk*
- 9:30 AM **Wetting Behaviors On Viscoelastic Coating Surface**
G. Pu, S. Severtson,
University Of Minnesota
- 9:50 AM Break
- 10:10 AM **Reactive Forced Wetting**
T. Blake,
University Of Mons
- 10:30 AM **Can We Optimize The Coating Of Heterogeneous Surfaces?**
J. De Coninck,
University Of Mons
- 10:50 AM **Adjustable Wetting Properties Of Paperboard By Liquid Flame Spray Process**
M. Stepien, J. J. Saarinen, *Abo Akademi University*; H. Teisala, M. Tuominen, M. Aromaa, J. Kuusipalo, J. M. Makela, *Tampere University Of Technology*; M. Toivakka, *Abo Akademi University*
- 11:10 AM **Defect-induced Modifications In Wetting Behavior On Micro-nano-hierarchical Textured Hydrophobic Surfaces**
J. Zhang, G. Pu, S. J. Severtson,
University Of Minnesota

Technical Session 7: Coating Surfaces And Structures

- 8:30 AM **Marangoni Instabilities In Transient Coating Flows: The Role Of Multiple Time Scales**
S. G. Yiantsios, *Aristotle University Of Thessaloniki*; B.G. Higgins, *University Of California*
- 8:50 AM **In-situ Measurement Of Surface Structure Formation Caused By Marangoni Flows During Drying Of Thin Films**
J. Krenn, P. Scharfer, W. Schabel, *Karlsruhe Institut Of Technology*
- 9:10 AM **Behavior Of Alkali-soluble Resin And Acrylic Latex Blends**
G. Pu, J. Zhang, S. J. Severson, *University Of Minnesota*; J. Guo, W. Wu And C. Miller, *Arkema Emulsion Systems*
- 9:30 AM **Crack Prevention In Soft Latex Coatings**
C. C. Roberts, L. F. Francis, *University Of Minnesota*
- 9:50 AM Break
- 10:10 AM **What Is At The Surface? Paint Adhesion To Polyolefins**
J. Song, *University Of Minnesota*; A. Batra, J. M. Rego, *The Dow Chemical Company*; M. A. Hillmyer, C. W. Macosko, *University Of Minnesota*
- 10:30 AM **Cellular Porous Patterns In Phase Separating Coatings Under Humidity-assisted Flow**
M. Yamamura, S. Eikai, Y. Mawatari, H. Kage, *Kyushu Institute Of Technology*
- 10:50 AM **Formation Of Topographical Patterns On Liquid Film Coatings Using Electric Fields**
S. A. Roberts, S. Kumar, *University Of Minnesota*
- 11:10 AM **Dynamics Of Surface Structure Evolution In Colloidal Adsorption: Charge Patterning And Polydispersity**
D. Brewer, M. Tsapatsis, S. Kumar, *University Of Minnesota*

Posters**Determination Of Diffusion Coefficients Of Water In Polymeric Films For Blood Glucose Test Strips**

S. Kachel, Y. Zhou, *Karlsruhe Institute Of Technology*; S. Duvall, *Roche Diagnostics Operations, Inc.*; P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*

Non-fickian Drying Behavior Of Binary Polymer Solution Coatings

M. Vinjamur, *Indian Institute Of Technology Bombay*

Tungstate-based Electrochromic Thin Films

Y. T. Park, J. Grunlan, *Texas A&M University*

When Sessile Drops Are No Longer Small: Transitions From Spherical To Fully Flattened

C. W. Extrand, Sung In Moon, *Entegris*

Coating And Drying Of SM-OLEDs

K. Peters, L. Wengeler, *Karlsruhe Institute Of Technology*; S. Hartmann, D. Bertram, *Phillips Technologie GmbH*; P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*

Halloysite Clay Nanotubes For Sustained Release Of Corrosion Inhibitors For Metal Protection

E. Abdullayev, Y. Lvov, *Louisiana Tech University*

Designing A Sensor For Local Heat Transfer In Impingement Driers

L. Wengeler, M. Schmitt, P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*

Flame Resistant Cotton Fabric With Nanocomposite Coating

Y. C. Li, J. Schulz, S. Mannen, J. C. Grunlan, *Texas A&M University*

Test Results Of Electronic Gap Tool To Confirm Gap Sizes In Adjustable Extruder Dies Operating At 260°C

B. Manning, *Capacitec*

Maintaining Gap And Parallelism Between Slot Die Coater Head And Media In Liquid Coating Applications

B. Manning, R.L. Foster, *Capacitec*

Dispersion Stability And Drying Behavior Of CIS Precursor Ink

Y.S. Kim, A. Lee, S. Kim, J. H. Sung, K.H. Ahn, S. J. Lee, *Seoul National University*

Vapor-liquid Equilibrium In Aqueous Polymer Mixtures For Blood Glucose Test Strips

S. Kachel, Y. Zhou, *Karlsruhe Institute Of Technology*; S. Duvall, *Roche Diagnostics Operations, Inc.*; P. Scharfer, W. Schabel, *Karlsruhe Institute Of Technology*

Computational Efforts Towards A Better Understanding Of Liquid Transfer In Printing Processes

S. Dodds, *University Of Minnesota*; M. Carvalho, *Pontificia Universidade Catholica Do Rio De Janeiro*; S. Kumar, *University Of Minnesota*

Transparent And Uv-resistant Poly(3,4-Ethylenedioxythiophene) Thin Films: Layer-by-layer Assembly With Absorbing Nanoparticles

J. C. Grunlan, T. Dawidczyk, M. Walton, *Texas A&M University*

Antimicrobial Thin Film Coatings Containing Quaternary Ammonium Surfactants

J. Grunlan, G. Sukhonsova, C. Dvoracek, *Texas A&M University*

Microstructure And Stress Development In Latex Coatings

K. Crawford, L. F. Francis, *University Of Minnesota*

Self Assembly Of Zeolite Nanoplatelets By Dip Coating

K. Varoon, L. F. Francis, M. Tsapatsis, *University Of Minnesota*

Coating Onto Open Celled Foam

H. Zhang, W. J. Suszynski, L. F. Francis, M. Tsapatsis, *University Of Minnesota*

Modelling And Simulation Of Soft-particle Colloidal Systems Under Dynamic Environmental Gradients.

R. Molecke And S. Xiong, *University Of New Mexico*; C. J. Brinker and P. R. Shunk, *University Of New Mexico And Sandia National Laboratories*

Electronanospray To Engineer Nanocomposite Biomedical Coatings With Controlled Drug Release

J. Dong, G. Haugstad, C. Fretham, *University Of Minnesota*; B. Hoerr, J. Foley,

M. Matuszewski, *Nanocopoeia*; J. Puskas, *University Of Akron*

Developing A Sustainable Solution For Scratch And Mar Resistance**In VOC Compliant Automotive Clearcoats**

D. Bhattacharya, *Eastman Chemical Company*; N. Randall, R. Nair, *CSM Instruments*;

S. K. Basu, K. McCreight, *Eastman Chemical Company*

On The Search For Numerical Boundary Conditions For The Computation Of Dynamic Contact Lines

M. Delia Giavedoni, R. Cerro, F. Saita, *University Of Alabama In Huntsville*

Low-flow Limits In Slot Coating With Apparent Pinning Effect And No Recirculation

T. Matsuda, *Lintec Corporation*; S. Kumar, L. Francis, *University Of Minnesota*;

M. Carvalho, *Puc-rio*

Influence Of Surface Energy On Setting And Transfer Of Water-based Systems

W. Luu, D. Bousfield, *University Of Maine*

An Efficient Vof-turbulent Coupled Model For Air Jet Wiping Process

G. Vatou, A. Tripathi, *Fluidyn France*; A. Murthy, A. Kumar, *Fluidyn India*; B. Kaushik,

Fluidyn North America; J. Hamburger, *Fluidyn France*

Novel Utilization Of Non Exploited Plants Seed Oil In Coating Applications

B. Vibhute, *Dept. Of Oil Technology, Laxminarayan Institute Of Technology, Nagpur*

(M.S.), *India*

Thin Film Models For Quantum Dot Structures In Solid Films

P. Evans, *Humboldt-Universität Zu Berlin*

Improving Waterborne Coatings Using A Formulated Nanoparticle Additive

D. Burgard, M. Herold, K. Steingroever, *Buhler Partec GmbH*;

S. Pilotek, *Buhler Inc.*

Analysis Of Adhesion Forces In Ink-transfer Process

M. Yu, S. Kim, J. Sung, K. Ahn, S. Lee, *Seoul National University*

Flow Visualization And Operating Limits Of Tensioned-web-over**Slot Die Coating Process**

J. Nam, *Rice University*; M. Carvalho, *Puc Rio*

Formation Mechanism Of Supraparticles Obtained By Drying Of Colloidal**Suspension Droplet On A Superhydrophobic Substrate**

Y. Hirano, S. Inasawa, M. Fujita, Y. Yamaguchi, *The University Of Tokyo*

Visualization Study For Flow Stability Between Rigid And Deformable Rolls

M. Sasaki, *JFE Steel*; W. Suszynski And L. F. Francis, *University Of Minnesota*;

M. Carvalho, *Pontificia Universidade Catolica Do Rio De Janeiro*

Theoretical and Experimental Investigation of the Gas Phase Mass Transport**on Flat Plates in Laminar Flow**

B. Schmidt-Hansberg, J. Krenn, M. Baunach, S. Baesch, P. Scharfer, W. Schabel;

Karlsruhe Institute of Technology

Coating Technologies for Ultracapacitor Components

J. R. Lim, F. M. Joos, P. Bell, and K.P. Reddy, *Corning*