

BOSTON, MA, USA • JULY 10 - 13, 2011

# PREP

FINAL PROGRAM

# 2011

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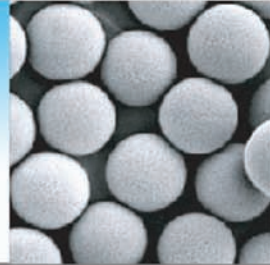
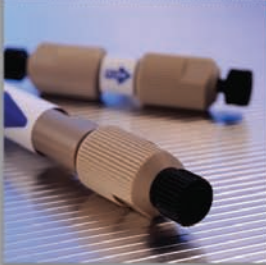


**24th International Symposium,  
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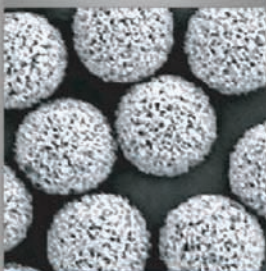
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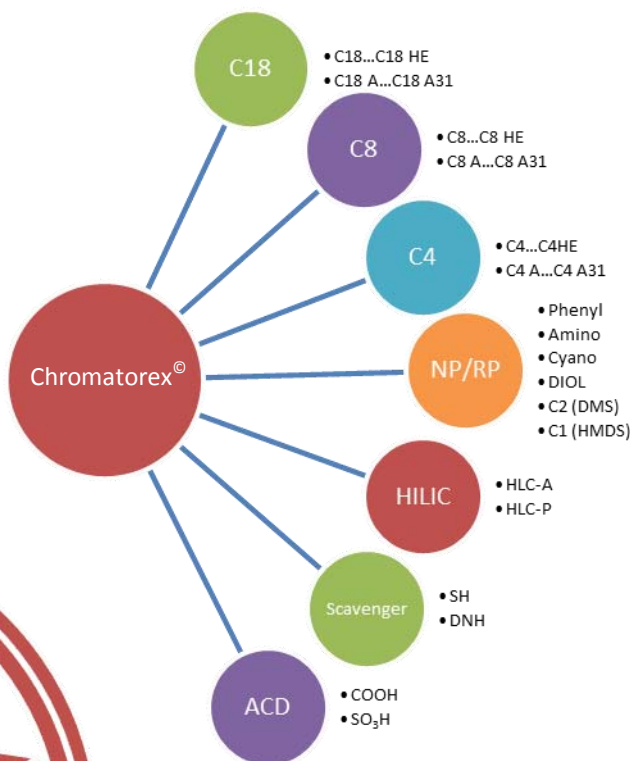


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PREP 2011 -- TUESDAY, JULY 12																				
<b>5. KEYNOTE: INDUSTRIAL CASE STUDIES IN CONTINUOUS CHROMATOGRAPHY</b>																				
8:40-9:00	Pinilla/UCB Pharma		X											X			X	X		
9:00-9:20	Kim/Ampac Fine Chemicals		X											X			X			X
9:20-9:40	Horneman/Xendo Manufacturing	X												X			X	X		X
9:40-10:00	Grabski/Semba Biosciences	X												X			X	X		X
10:00-10:20	Bisschops/Tarpon Biosystems													X			X			X
<b>6. STATIONARY PHASES, PROCESSES, AND APPLICATIONS</b>																				
10:50-11:10	Mueller/Karlsruhe Institute of Technology					X											X	X		X
11:10-11:30	Jungbauer/BOKU Vienna					X											X	X		X
11:30-11:50	Fee/Univ. of Canterbury													X	X		X	X		X
11:50-12:10	Eriksson/GE Healthcare													X			X	X		X
12:10-12:30	Snyder/Bio-Rad Laboratories	X												X			X	X		X
2:00-3:25	<b>POSTER SESSION - II</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>7A. FUNDAMENTALS AND THEORY</b>																				
3:30-3:50	Felinger/Univ. of Pecs					X	X							X			X			X
3:50-4:10	Fornstedt/Karlstad University		X			X	X							X	X		X			X
4:10-4:30	Seidel-Morgenstern/Max Planck Inst., Magdeburg					X	X							X						X
4:30-4:50	Ottens/Delft University of Technology					X	X							X			X	X		X
<b>7B. NEW APPLICATIONS AND SYSTEMS</b>																				
3:30-3:50	Thomas/Univ. of Birmingham					X								X			X	X		
3:50-4:10	Liang/I-Shou University, Taiwan					X								X			X			X
4:10-4:30	Ozdural/Hacettepe University, Ankara					X											X			
4:30-4:50	Yang/East Carolina University					X											X			X
<b>8A. MONOLITHS AND MEMBRANES</b>																				
5:10-5:30	Podgorni/BIA Separations					X								X	X		X			X
5:30-5:50	Ghosh/Research Center Juelich					X								X	X		X			X
5:50-6:10	Dimartino/Univ. of Canterbury	X				X								X	X		X			X
<b>8B. ALTERNATIVES TO SOLID STATIONARY PHASES</b>																				
5:10-5:30	Ignatova/Brunel University					X								X			X			
5:30-5:50	Hopmann/Friedrich-Alexander University, Erlangen					X								X			X			
5:50-6:10	Yang/GSK					X											X			X



# PREP 2011 Symposium, Exhibits and Workshops

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Professor Giorgio Carta, University of Virginia

## Symposium Chair

Professor Georges Guiochon, University of Tennessee

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*The use of cameras and cell phones are not permitted during program sessions. Cameras are permitted on the exhibit floor; however, permission from the exhibitors involved must be obtained before photographs can be taken.*

*Opinions expressed by individuals presenting abstracts and workshops are not necessarily the opinions of the PREP 2011 Symposium*

**[www.PREPsymposium.org](http://www.PREPsymposium.org)**

## Welcome to PREP 2011

On behalf of the Organizing Committee, we welcome you to Boston and PREP 2011, the 24th International Symposium, Exhibit & Workshops on Preparative and Process Chromatography.

Chromatography continues to play a critical role in chemical and biochemical manufacturing from the gram scale to the multiple ton scale and we expect that its importance will continue to grow as the technology continues to improve and the range of applications continues to expand. PREP 2011 brings you a very rich scientific program with 66 oral papers and 90 poster presentations. The oral program includes keynote sessions on Industrial Case Studies in Protein Chromatography and on Industrial Continuous Chromatography as well as two keynotes dedicated to the emerging field of preparative Supercritical Fluid Chromatography. Posters will be on display over a two-day period allowing you to interact extensively with the presenters.

PREP 2011 also includes a vibrant Workshop Program as well as an extensive Vendor Exhibit. The Workshop Program includes three Sunday training courses on Preparative Chromatography for Biopharmaceuticals, Preparative Chromatography for Intermediates and APIs, and Bringing Pharmaceuticals and Biomolecules to Market, as well as two vendor workshops providing in-depth coverage on chromatography products, processes, and technology. The Exhibit Program includes 24 vendor booths through which you can become familiar with the latest commercial advances in the field. We invite you to take advantage of all of these unique training and educational opportunities and to interact with vendors and providers of chromatography media, equipment, processes, and services.

Many people need to be thanked for making PREP 2011 possible. Firstly, we would like to thank the members of the Scientific Advisory Committee and of the Industrial Advisory Committee for their help in planning and promoting the Symposium and reviewing the abstracts. Secondly, we would like to thank our industrial sponsors, who have provided very generous financial support. Thirdly, we would like to thank all of the vendors for participating in the Exhibit and Workshop programs, as well as all of the people who have submitted so many excellent abstracts. Finally, we would like to thank you for attending PREP 2011. We very much hope you will enjoy the meeting and take home with you a wealth of information that will enable you to solve today's separation problems and be prepared for the future of preparative chromatography.

Giorgio Carta, University of Virginia, Program Chair  
Georges Guiochon, University of Tennessee, Symposium Chair



# GENERAL INFORMATION

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<b>VENUE</b>	Hyatt Regency Cambridge (Overlooking Boston, MA) 575 Memorial Drive, Cambridge, MA 02139-4896, USA Phone 617-492-1234
<b>BADGES</b>	A name badge must be worn by each registered participant and accompanying person in order to gain admittance to the meeting and social gatherings.
<b>REGISTRATION</b>	If you need assistance, please come to the Symposium Registration Desk located in the Courtyard Reception Area, lobby level.  <u>Registration Hours</u> Sunday                    6:00 PM – 8:00 PM Monday                   8:00 AM – 5:00 PM Tuesday                   8:00 AM – 5:00 PM Wednesday              8:00 AM – 4:00 PM
<b>MEETING LOCATION</b>	General and parallel sessions take place in President's Ballroom A-B. <b>The entrance to President's Ballroom B is located at the back left side of the exhibit hall</b> located in President's Ballroom C-D. See the floor plan located on the outside back cover of the Final Program.
<b>EXHIBITS</b>	The exhibition is an important component of the meeting, so please take the time to thank all the exhibitors for their support of the program by visiting the booths located in President's Ballroom C-D and the Prefunction area. See the exhibit floor plan located on the outside back cover of the Final Program.
<b>EXHIBIT HOURS</b>	Sunday                    6:00 PM – 8:00 PM Monday                   10:00 AM – 6:30 PM Tuesday                   10:00 AM – 6:30 PM
<b>RECEPTION</b>	Sunday, July 10, 2011 @ 6:00 PM – 8:00 PM (Exhibit Area—President's Ballroom C-D and Prefunction area)
<b>FREE VENDOR WORKSHOPS</b> <u>Must sign up to attend</u>	Free vendor workshops will take place on Monday and Tuesday. Don't delay to sign up at the sponsor's booth located in the exhibit hall (President's Ballroom C-D, lobby level). Registration is accepted until the workshop is full. Sign up as early as possible as seating is limited!  <i>Monday, July 11</i> Free Vendor Workshop <i>12:45-2:00 pm</i> Sponsored by Pall Life Sciences <i>Location:</i> "Purification of Antibody and Non-antibody <i>William Dawes Room</i> Proteins using Mixed-Mode Chromatography"  <i>Tuesday, July 12</i> Free Vendor Workshop <i>12:45-2:00 pm</i> Sponsored by Agilent Technologies <i>Location:</i> "siRNA: Scale-Up and Manufacturing" <i>William Dawes Room</i>
<b>MESSAGES</b>	Located near the meeting rooms will be a board for messages as well as for posting notices of positions available and positions wanted.

## GENERAL INFORMATION

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### POSTER LOCATIONS

Thomas Paine Room, Haym Saloman Room, and Riverside Pavilion (outdoor tent). All rooms are located on the lobby level. See the floor plan located on the outside back cover of the Final Program.

### POSTER SESSIONS

- SETUP: **ALL posters in Poster Session I and II should be put up on poster boards on Monday** between 8:30 a.m.-1:00 p.m. and left on the poster boards for participants to view both days.
- Poster boards are labeled with the number corresponding to the abstract number in the Final Program Book (see the Author Index located on page 95 of the Final Program).
- Posters with program numbers in the P-100 series are presented during Poster Session I. Authors presenting posters in Poster Session I are requested to be in attendance at their poster board during Poster Session I that takes place on Monday at 2:00-3:25 p.m.
- Posters with program numbers in the P-200 series are presented during Poster Session II. Authors presenting posters in Poster Session II are requested to put up their posters on **Monday** morning and to be in attendance at their poster board during Poster Session II that takes place on Tuesday at 2:00-3:25 p.m.
- TEARDOWN: All posters must be removed after the end of Tuesday's Poster Session II, between 3:25-6:15 p.m. (anything remaining after 6:15 p.m. on Tuesday will be discarded).

### POSTER COMPETITION

Poster presentations are a very important component of the PREP Symposia. In order to acknowledge their contribution to the field and high standards of the symposium, awards will be offered to the best posters at PREP 2011. All presented posters will be evaluated on the basis of scientific content, clarity of presentation, and layout. The Poster Judging Committee will have final say in the selection of the Prize Winners. At least two committee members will read each poster and top posters will be read by at least four committee members. If a poster author does not want his/her poster considered for a poster award, they must notify the PREP Symposium Manager before 4:00 p.m. on Tuesday, July 12.

*Wednesday, July 13*

Presentation of awards to winners of the Best Poster Competition will take place at 10:20 a.m. on Wednesday morning following the last talk in Session 9. The awards will be presented by Dr. Kathleen Muhlbacher, Poster Session Chair. The winners do not have to be present to win.

### AUTHOR INDEX

The Author Index is located in the back of the Final Program Book.  
“L” preceding the abstract number = Lecture  
“P” preceding the abstract number = Poster

# PREP 2011 Scientific Program

Sunday, July 10, 2011

9:00 am-12:15 pm  
Room: William Dawes

## **Workshop 1: Preparative Chromatography for Biopharmaceuticals**

Lecturers: Giorgio Carta, University of Virginia; Alan K. Hunter, MedImmune;  
Alois Jungbauer, BOKU, Vienna

This workshop will focus on the theory and practice of biomolecule chromatography. Since mass transfer and the structure of the stationary phase influence deeply chromatographic performance, the main emphasis is on describing adsorption/desorption kinetics in single and multicomponent systems and determining the relationship between stationary phase properties and process performance. The latest advances in stationary phase developments will be reviewed along with methods for their experimental characterization. Design and optimization strategies for capture and high-resolution applications will be discussed. Topics: Adsorption equilibrium and transport in single and multicomponent systems; Stationary phases for small and large biomolecules; Design and optimization for capture and high-resolution steps.

### **Lecturers**

**Giorgio Carta** received his Ph.D. in Chemical Engineering from the University of Delaware in 1984. Since then he has been a professor in the Department of Chemical Engineering at the University of Virginia, where his research focuses on transport phenomena and bioseparations. He regularly organizes professional courses on various aspects of bioseparations, including a course on protein chromatography development and scale-up together with Alois Jungbauer.

**Alan Hunter** received his Ph.D. in Chemical Engineering from the University of Virginia in 2002 and is currently Principal Scientist in the Process Biochemistry Group at MedImmune. Prior to joining MedImmune he held positions of Process Engineer at Cambrex Bio Science Baltimore, and of Senior Principal Scientist at Pfizer Biologics. Dr. Hunter has broad biotechnology experience and expertise in areas including process development for large-scale cGMP manufacture of biologics, recombinant biopharmaceutical purification, and technology transfer and scale-up.

**Alois Jungbauer** is the head of protein technology and downstream processing at the Department of Biotechnology of the University of Natural Resources and Applied Life Sciences in Vienna (Austria). For more than 20 years, Professor Jungbauer has worked in biochemical engineering, with a focus on bioseparation, where he has published widely and holds 15 patents. For over 10 years, he has organized a biennial professional course in protein chromatography focused on mass transfer, dispersion, and scale-up.

9:00 am-12:15 pm

Room: *Crispus Attucks*

**Workshop 2: Preparative Chromatography for Intermediates and APIs**

Lecturers: Olivier Dapremont, Ampac Fine Chemicals; Kathleen Mihlbachler, Bristol-Meyers Squibb; Larry Miller, Amgen

This workshop will focus on development of method for the preparative purification of small molecules for the pharmaceutical industry. After an introduction of the theory, optimization and practice of prep HPLC, SMB and SFC for small molecule separations, the instructors will present practical approaches to the development of preparative separation through a series of examples. The attendees will learn valuable information and techniques to apply in the laboratory and at manufacturing scale to increase throughput and performance. Topics: Prep HPLC batch - Theory, optimization and practice; SMB - Principle and technology; SMB - Examples and applications; SFC - Theory, equipment and examples.

**Lecturers**

**Dr. Dapremont** has worked on the development of SMB technology since 1992. He is Director of Process Technologies at AMPAC Fine Chemicals where his role encompasses the development of SMB separations using multiple SMB units ranging from 4.6 mm to 1 m in diameter as well as developing continuous processes for the manufacturing of APIs

**Dr. Mihlbachler** has worked in the field of separation technology with an emphasis on chromatography for the last 15 years. In her current role as a Senior Research Investigator II in PRD at BMS (New Brunswick, NJ), she develops purification/separation processes for pharmaceutical intermediates and API, in particular for chiral compounds and peptides. Dr. Mihlbachler held positions at Pharmacia/Pfizer (kg-scale chiral separation) and Eli Lilly and Company where she also evaluated multi-column continuous chromatography for bio-molecule purification.

**Dr. Miller** is a Principal Scientist in the Discovery Analytical Sciences group at Amgen in Cambridge, MA. He graduated with a B.S. degree from the University of Illinois in Urbana-Champaign in 1984 and a M.S. from Roosevelt University in 1990. In 1984 he joined Searle in suburban Chicago as an analytical chemist. He spent twenty years performing small molecule achiral and chiral purifications at the mg to multi-kg scale, utilizing preparative HPLC, steady state recycle (SSR) and simulated moving bed (SMB) chromatography. While at Searle/Pharmacia, Larry managed a group of ten scientists within a purification center of excellence providing purification support to three R&D sites. In 2004 Larry joined Amgen where he is responsible for discovery and early development purification support utilizing preparative SFC and HPLC.

1:30-4:30 pm

Room: *Crispus Attucks*

**Workshop 3: Bringing Pharmaceuticals and Biomolecules to Market  
(and keeping them there)**

Lecturers: Lois Ann Beaver, LAB Enterprises; Joan Newburger, Johnson & Johnson  
Consumer Products Worldwide

This workshop will focus on Quality by Design, Quality Systems Management, Science-based Risk Management, Process Analytical Technology and Continuous Process Improvement as tools that can be incorporated into basic drug development processes. We will examine the relationship between good drug development science, quality and regulatory flexibility, with emphasis on application to the biopharmaceutical industry. Particular attention will be placed on the practice of Quality by Design. A practical study of how the integration of quality and risk management is used in an application to bring a mAb to market will be presented. In addition, we will address the challenges for technology and regulation created by the emerging biosimilars industry along with the current status of internationally developed guidance. Topics: Regulatory aspects, QbD, Process Analytical Technology, Quality System Management, Biosimilars, Marketing.

**Lecturers**

After a multi-decade career with the U.S. Food and Drug Administration, in 2009 **Lois Ann Beaver** founded a regulatory consulting group, LAB Enterprises. While working in FDA's Office of the Commissioner, Lois served on the FDA Pharmaceutical Quality Council that conceived and developed quality by design; led activity for FDA's joining the international Pharmaceutical Inspection Cooperation Scheme; worked as liaison with international organizations such as WHO, most recently focusing on biosimilars; managed the export program for international investigations of unapproved pharmaceuticals; was associate director for international harmonization working on international best practice and standardization activities such as the ICH; was US Coordinator for Veterinary ICH; and served as delegate to the APEC (Asia Pacific Economic Cooperation) Life Sciences Innovation Forum. Lois also led international projects on anti-counterfeiting of medical products and good manufacturing practices in pharmaceutical firms in emerging countries, and established a pharmaceutical information center in Cairo.

**Dr. Newburger** has worked in pharmaceutical development for over 25 years at Wyeth Ayerst, Bristol-Myers Squibb and, currently, Johnson & Johnson. During the first half of her career, she led separations groups supporting medicinal, formulations and process chemists. For the past 7+ years, Dr. Newburger has led cross-functional teams, including clinical, CM&C, toxicology, regulatory and commercial members, having the responsibility of developing and implementing strategies for all Phases of prescription drug development and post-Approval support.

6:00-8:00 pm

**SYMPOSIUM REGISTRATION**

Location: Courtyard Reception Area, lobby level

6:00-8:00 pm

**WELCOME RECEPTION & EXHIBITION  
Sponsored in part by Pall Life Sciences**

Location: President's Ballroom C-D and Prefunction area, lobby level

8:00 am – 5:00 pm **SYMPOSIUM REGISTRATION OPEN**  
Location: Courtyard Reception Area

10:00 am – 6:30 pm **EXPOSITION**  
Location: President's Ballroom C-D and Prefunction area

8:30 am **WELCOME & OPENING REMARKS**  
Meeting Location: President's Ballroom A

**1. KEYNOTE: INDUSTRIAL CASE STUDIES IN PROTEIN CHROMATOGRAPHY**

Meeting Location: President's Ballroom A-B, lobby level  
Chair: Giorgio Carta, University of Virginia

8:40 am L-101 **Quality by Design for Biopharmaceuticals: Scientific Challenges in Preparative and Process Chromatography.** P. David Robbins, Ziping Wei, MedImmune, Gaithersburg, MD, USA

9:00 am L-102 **Transient pH Excursions in Cation Exchange Chromatography: Role of Buffer Ion Depletion during Salt Transitions.** Arthur Hewig<sup>1</sup>, Benj Guzman<sup>1</sup>, Megan McClure<sup>1</sup>, Susan Cornelius<sup>2</sup>, John Moscariello<sup>1</sup>, <sup>1</sup>Amgen, Seattle, WA, USA; <sup>2</sup>Genentech, S. San Francisco, CA, USA

9:20 am L-103 **Resolving Challenges in Developing a Scale Down Model to Understand Manufacturing Scale Results.** Yiming Yang, Priyanka Desai, Elsie DiBella, James Stout, David Nichols, Shire HGT, Cambridge, MA, USA

9:40 am L-104 **Characterization and Investigation of the Double-peak Cation Exchange Chromatography Elution Profiles of an Aglycosylated Monoclonal Antibody.** Jessica Diao, Rick St. John, Genentech, S. San Francisco, CA, USA

10:00 am L-105 **Biopharmaceutical Downstream Platform Development: Resolution and Pore Structure Characterization of High Capacity Ion Exchangers for the Removal of Product Related Variants.** Eric Suda, Antonio Ubiera, Kent Goklen, GlaxoSmithKline, King of Prussia, PA, USA

10:20 am **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

## 2. BIOMOLECULAR AND PROCESS MODELING

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Meeting Location: President's Ballroom A

Chair: Alois Jungbauer, BOKU

- 10:50 am L-106 **Partial Shrinking-core Model for the Uptake of Protein in Polymer-modified Ion-exchange Media.** Brian D. Bowes, Abraham M. Lenhoff, University of Delaware, Newark, DE, USA
- 11:10 am L-107 **Insights into Protein Selectivity in Multimodal Chromatography.** Steven Cramer, Melissa Holstein, Alex Freed, Ying Hou, Siddharth Parimal, RPI, Troy, NY, USA
- 11:30 am L-108 **Model-based Prediction of Monoclonal Antibody Retention in Ion-exchange Chromatography.** Bertrand Guélat<sup>1</sup>, Guido Ströhlein<sup>2</sup>, Marco Lattuada<sup>1</sup>, Lydia Delegrange<sup>3</sup>, Pascal Valax<sup>3</sup>, Massimo Morbidelli<sup>1</sup>, <sup>1</sup>ETH Zürich, Zürich, SWITZERLAND; <sup>2</sup>ETH Zürich / ChromaCon AG, Zürich, SWITZERLAND; <sup>3</sup>Merck Serono SA, Fenil-sur-Corsier, SWITZERLAND
- 11:50 am L-109 **Thermodynamic and Kinetic Modeling of Lysozyme Adsorption onto Mesoporous Silica.** Rebecca J. Desch, Jungseung Kim, Stephen W. Thiel, Neville G. Pinto, University of Cincinnati, Cincinnati, OH, USA
- 12:10 pm L-110 **Simplified Mechanistic Models for Linear Gradient Elution Chromatography of Proteins and Other Large Biological Products for Process Design and Process Understanding.** Shuichi Yamamoto, Yamaguchi University, Yamaguchi, JAPAN
- 12:30-2:00 pm **PAUSE, EXHIBITS, POSTERS, FREE VENDOR WORKSHOP**
- 12:45-2:00 pm **FREE VENDOR WORKSHOP SPONSORED BY PALL LIFE SCIENCES**  
***Purification of Antibody and Non-antibody Proteins using Mixed-Mode Chromatography***  
*Warren E. Schwartz, Ph.D., Senior Technical Director, Chromatography, Pall Life Sciences*  
Meeting Location: William Dawes Room (*light lunch will be provided*)  
Must register with Pall Life Sciences in order to attend as seating is limited
- 2:00-3:25 pm **POSTER SESSION I**  
Chair: Kathleen Mihalbachler  
Location: Thomas Paine Room, Haym Saloman Room, and Riverside Pavilion (outdoor tent)  
See the floor plan located on the outside back cover of the Final Program  
See pages 25-28 for the list of posters that will be presented

### 3A. BIOPROCESS APPLICATIONS - I

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Meeting Location: President's Ballroom A  
Chair: Owen Thomas, University of Birmingham

- 3:30 pm L-111 **Dynamic Binding Capacity of PEGylated Protein on Cation-exchange Chromatography Resins.** Jia Liu<sup>1</sup>, Siegfried Rieble<sup>2</sup>, Shih-hsie Pan<sup>2</sup>, Sanchayita Ghose<sup>2</sup>, <sup>1</sup>Bristol-Myers Squibb Company, East Syracuse, NY, USA; <sup>2</sup>Bristol-Myers Squibb Company, Pennington, NJ, USA
- 3:50 pm L-112 **Replacement of Chromatography Media for a Licensed Biological Product – A Case Study for Development, Characterization and Risk Mitigation Strategies.** Alejandro Toro, Victor Melendez-Colon, Tara Jones, Jose Hector Rivera, Amgen, Juncos, PR, USA
- 4:10 pm L-113 **Application of a QbD Model for Purification and Process Characterization of a Monoclonal Antibody Utilizing a Multimodal Chromatography Resin.** Sunitha Kandula, Edward Glowacki, Thomas Linden, Merck, Union, NJ, USA
- 4:30 pm L-114 **pH Transients in Protein A Affinity Chromatography.** Rainer Hahn<sup>1</sup>, Michael Samassa<sup>1</sup>, Giorgio Carta<sup>2</sup>, <sup>1</sup>University of Natural Resources and Life Science Vienna, Vienna, AUSTRIA; <sup>2</sup>University of Virginia, Charlottesville, VA, USA
- 4:50 pm **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

### 3B. CHROMATOGRAPHY FOR API PURIFICATION

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Meeting Location: President's Ballroom B (entrance located back left side of exhibit hall)  
Chair: Attila Felinger, University of Pecs

- 3:30 pm L-115 **Cost-effective Preparative HPLC Processes using Innovative, API-selective Stationary Phases.** Jin Seok Hur<sup>1</sup>, Björn Degel<sup>2</sup>, Sibylla Hoeltge<sup>2</sup>, Damien Formaglio<sup>3</sup>, Eric Lang<sup>4</sup>, Jean Blehaut<sup>4</sup>, <sup>1</sup>NOVASEP Inc., Boothwyn, PA, USA; <sup>2</sup>instrAction GmbH, Ludwigshafen, GERMANY; <sup>3</sup>Novasep Process, Pompey, FRANCE; <sup>4</sup>Groupe Novasep, Pompey, FRANCE
- 3:50 pm L-116 **Chiral Separation and Fractionation by Analytical/Semi-Prep Supercritical Fluid Chromatography with Circular Dichroism (CD) Detection.** Muneo Saito<sup>1</sup>, Yoshiteru Horikawa<sup>1</sup>, Keijin Iwaya<sup>1</sup>, Takeshi Kanomata<sup>1</sup>, Masao Bounoshita<sup>1</sup>, David J. Tognarelli<sup>2</sup>, <sup>1</sup>JASCO Corporation, Tokyo, JAPAN; <sup>2</sup>JASCO Inc., Easton, MD, USA
- 4:10 pm L-117 **Performance of Immobilized Chiral Stationary Phases.** Norbert M. Maier, Clinton Amoss, Bruce Coryell, James Lee, William L. Watts, Jr., Chiral Technologies Inc., West Chester, PA, USA
- 4:30 pm L-118 **Development and Optimization of the Polishing SP Chromatography Step for a Recombinant Enzyme.** Ying Yang, Wei Tang, Ting Yang, Eric Tang, Yong Wang, Jim Stout, Dave Nichols, Shire HGT, Cambridge, MA, USA
- 4:50 pm **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

**4A. COLUMNS AND STATIONARY PHASES**

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Meeting Location: President's Ballroom A  
Chair: Abraham Lenhoff, University of Delaware

- 5:10 pm L-119 **Estimation of Chromatographic Column Performances using Computer Tomography and CFD-Simulations.** Irma Schmidt, Mirjana Minceva, Wolfgang Arlt, Friedrich-Alexander University Erlangen-Nuremberg, Erlangen, GERMANY
- 5:30 pm L-120 **Polyethylene Glycol (PEG) Modification of Capillary-Channeled Polymer (C-CP) Fibers for High Performance Liquid Chromatography (HPLC) Stationary Phases.** Jennifer J. Pittman, Abby J. Schadock-Hewitt, Ken Christensen, R. Kenneth Marcus, Clemson University, Clemson, SC, USA
- 5:50 pm L-121 **Reactive Gelation: Strong Cation Exchange Monoliths.** Bastian Brand, Martin Krättli, Giuseppe Storti, Massimo Morbidelli, ETH Zürich, Zürich, SWITZERLAND
- 6:10 pm **PAUSE**

**4B. SCALE DOWN MODELS AND HIGH THROUGHPUT SCREENING**

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Meeting Location: President's Ballroom B (entrance located back left side of exhibit hall)  
Chair: Joan Newburger, Johnson & Johnson Consumer and Personal Products Worldwide

- 5:10 pm L-122 **Managing the Impact of Resin Lot Variability on Drug Substance Product Quality in a Manufacturing Process.** Jennafer Lyons, Victoria Brock, Christopher Gallo, Pfizer, Andover, MA, USA
- 5:30 pm L-123 **Automated Small Scale Bio-Chromatography.** Tim Schroeder, Jürgen Friedle, Atoll GmbH, Weingarten, GERMANY
- 5:50 pm L-124 **Optimization of Protein Purification using Automated Small-scale Separation Columns.** Renee Tobias, Lee Hoang, Chris Suh, Doug Gjerde, Phynexus, San Jose, CA, USA
- 6:10 pm **PAUSE**

8:00 am – 5:00 pm     **SYMPOSIUM REGISTRATION OPEN**  
Location: Courtyard Reception Area

10:00 am – 6:30 pm     **EXPOSITION**  
Location: President's Ballroom C-D

**5. KEYNOTE: INDUSTRIAL CASE STUDIES IN CONTINUOUS CHROMATOGRAPHY**

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Meeting Location: President's Ballroom A  
Chair: Olivier Dapremont, Ampac Fine Chemicals

8:40 am     L-201     **Application of Chiral Chromatography for Industrial Process.** Veronique Pinilla, Celal Ates, UCB Pharma, Braine l'alleud, BELGIUM

9:00 am     L-202     **Effects of Elution Order and Sample Composition on Productivity in Simulated Moving Bed Chromatography.** Hyunjung Kim, Olivier Dapremont, William DuBay, Ampac Fine Chemicals, Rancho Cordova, CA, USA

9:20 am     L-203     **Embedding Continuous Chromatography in a Batch Manufacturing Environment.** Danielle Horneman<sup>1</sup>, Marc Bisschops<sup>2</sup>, Ruth de la Fuente Sanz<sup>1</sup>, Maarten Pennings<sup>1</sup>, <sup>1</sup>Xendo Manufacturing, Leiden, THE NETHERLANDS; <sup>2</sup>Tarpon Biosystems, Marlborough, MA, USA

9:40 am     L-204     **Applications of Continuous Chromatographic Separation in Protein Purification.** Anthony Grabski, Bruce Thalley, Alla Zilberman, Robert Mierendorf, Semba Biosciences Inc., Madison, WI, USA

10:00 am     L-205     **The Use of BioSMB™ Technology to Enable a Disposable Size Exclusion Chromatography Process for Vaccines.** Marc Bisschops<sup>1</sup>, Hua Jiang<sup>2</sup>, Maarten Pennings<sup>3</sup>, John Madsen<sup>2</sup>, <sup>1</sup>Tarpon Biosystems, Worcester, MA, USA <sup>2</sup>Novavax, Rockville, MD, USA; <sup>3</sup>Xendo Manufacturing, Leiden, THE NETHERLANDS

10:20 am     **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

**6. STATIONARY PHASES, PROCESSES AND APPLICATIONS**

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Meeting Location: President's Ballroom A  
Chair: Igor Quinones-Garcia, Shire

- 10:50 am L-206 **Thermoresponsive Bioseparation: An Innovative Combination of Temperature-responsive Adsorbents and a Novel Reactor Arrangement for Liquid Chromatography.** Haiyang Liu<sup>1</sup>, Ping Cao<sup>1</sup>, Tobias Mueller<sup>2</sup>, Jonas Wohlgemuth<sup>2</sup>, Matthias Franzreb<sup>2</sup>, Owen Thomas<sup>1</sup>, <sup>1</sup>University of Birmingham, Birmingham, UK; <sup>2</sup>Karlsruhe Institute of Technology, Leopoldshaven, GERMANY
- 11:10 am L-207 **Isolation of Baculovirus and Baculovirus Derived VLP by Monolithic Columns.** Alois Jungbauer, Eva Kopecky, Reingard Grabherr, Nico Lingg, BOKU, Vienna, AUSTRIA
- 11:30 am L-208 **Mixed Mode Anion and Cation Exchange Chromatography using a Customizable Mixed Matrix Membrane (MMM) for Whey Proteins.** Syed Saufi<sup>1</sup>, Conan Fee<sup>2</sup>, <sup>1</sup>Universiti Malaysia Pahang, Pahang, MALAYSIA; <sup>2</sup>University of Canterbury, Christchurch, NEW ZEALAND
- 11:50 am L-209 **Development of Capture and Intermediate Chromatography Steps for Insulin Purification, using HTPD and DoE.** Kjell Eriksson<sup>1</sup>, Elisabeth Hallgren<sup>1</sup>, Jamil Shanagar<sup>1</sup>, Sara Gronlund<sup>1</sup>, Eva Heldin<sup>1</sup>, Heloisa Tunes<sup>2</sup>, Mariza Xavier<sup>2</sup>, Luciano Viela<sup>2</sup>, <sup>1</sup>GE Healthcare, Uppsala, SWEDEN; <sup>2</sup>BIOMM S.A., Belo Horizonte, BRAZIL
- 12:10 pm L-210 **A New, Robust Method for Protein Elution from Ceramic Hydroxyapatite.** Mark Snyder, Larry Cummings, Bio-Rad Laboratories, Hercules, CA, USA
- 12:30-2:00 pm **PAUSE, EXHIBITS, POSTERS, FREE VENDOR WORKSHOP**
- 12:45-2:00 pm **FREE VENDOR WORKSHOP SPONSORED BY AGILENT TECHNOLOGIES**  
***siRNA: Scale-Up and Manufacturing***  
*Michael Meys, Alnylam Pharmaceuticals*  
Meeting Location: William Dawes Room (*light lunch will be provided*)  
Must register with Agilent Technologies in order to attend as seating is limited
- 2:00-3:25 pm **POSTER SESSION II**  
Chair: Kathleen Mihlbachler  
Location: Thomas Paine Room, Haym Saloman Room, and Riverside Pavilion (outdoor tent)  
See the floor plan located on the outside back cover of the Final Program  
See pages 29-32 for the list of posters that will be presented

## 7A. FUNDAMENTALS AND THEORY

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Meeting Location: President's Ballroom A  
Chair: Lois Ann Beaver, LAB Enterprises

- 3:30 pm L-211 **Optimum Experimental Conditions in Preparative Chromatography – The Influence of Particle Size and Shell Thickness of Core-Shell Packing Materials.** Attila Felinger<sup>1</sup>, Krisztian Horvath<sup>2</sup>, <sup>1</sup>University of Pecs, Pecs, HUNGARY; <sup>2</sup>University of Pannonia, Veszprem, HUNGARY
- 3:50 pm L-212 **Preparative Separation of Chiral Pharmaceutical Compounds - The Effects of Packing Particle Size, Pressure Limit and Column Geometry on Productivity and Solvent Consumption.** Torgny Fornstedt, Martin Enmark, Jörgen Samuelsson, Patrik Forssén, Karlstad University, Karlstad, SWEDEN
- 4:10 pm L-213 **Prediction of Competitive Adsorption Equilibria for General Single Component Adsorption Isotherm Shapes using the Ideal Adsorbed Solution Theory.** Héctor Octavio, Rubiera Landa, Dietrich Flockerzi, Andreas Seidel-Morgenstern, Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, GERMANY
- 4:30 pm L-214 **High-throughput Protein Precipitation and Hydrophobic Interaction Chromatography - Salt Effects and Thermodynamic Interrelation.** Beckley K. Nfor, Nienke N. Hylkema, Koenraad R. Wiedhaup, Luuk A.M. van der Wielen, Peter D.E.M. Verhaert, Marcel Ottens, Delft University of Technology, Delft, THE NETHERLANDS
- 4:50 pm **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

## 7B. NEW APPLICATIONS AND SYSTEMS

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Meeting Location: President's Ballroom B (entrance located back left side of exhibit hall)  
Chair: Alan Hunter, MedImmune

- 3:30 pm L-215 **Visualising Adsorbent Particle Movement in Expanded Beds.** Haiyang Liu<sup>1</sup>, Jonathan Souquet<sup>2</sup>, Xianfeng Fan [3], Eirini Theodosiou [4], Owen Thomas<sup>1</sup>, <sup>1</sup>University of Birmingham, Birmingham, UK; <sup>2</sup>National Biomanufacturing Centre, Liverpool, UK; <sup>3</sup>University of Edinburgh, Edinburgh, UK; <sup>4</sup>Loughborough University, Loughborough, UK
- 3:50 pm L-216 **Fractionation of PEGs by Simulated Moving Bed with Size Exclusive Chromatography.** Ming-Tsai Liang, Ru-Chien Liang, I-Shou University, Kaohsiung City, TAIWAN
- 4:10 pm L-217 **A Study of Boron Isotope Enrichment with Annular Chromatography.** Gonca Saglam<sup>1</sup>, Ece Mindek<sup>1</sup>, Gönül Akkaya<sup>2</sup>, Ahmet Özduval<sup>1</sup>, <sup>1</sup>Hacettepe University, Ankara, TURKEY; <sup>2</sup>University of Mersin, Mersin, TURKEY
- 4:30 pm L-218 **Subcritical Water Chromatography: A Promising Green Liquid Chromatography Technique.** Yu Yang, East Carolina University, Greenville, NC, USA
- 4:50 pm **PAUSE IN THE EXHIBIT AREA**  
Location: President's Ballroom C-D and Prefunction area

## 8A. MONOLITHS AND MEMBRANES

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Meeting Location: President's Ballroom A  
Chair: Shuichi Yamamoto, Yamaguchi University

- 5:10 pm L-219 **Designing Purification Process Comprising Convective Chromatographic Media using Pressure Drop Data.** Ales Podgornik, Nika Lendero Krajnc, Franc Smrekar, Ales Strancar, BIA Separations d.o.o., Ljubljana, SLOVENIA
- 5:30 pm L-220 **Modeling of Stacked and Spiral Wound Membrane Chromatography - Zonal Rate Model Approach.** Pranay Ghosh<sup>1</sup>, Min Lin<sup>2</sup>, Jens Vogel<sup>2</sup>, Martina Pohl<sup>1</sup>, Wolfgang Wiechert<sup>1</sup>, Eric von Lieres<sup>1</sup>, <sup>1</sup>Research Center Juelich, Juelich, GERMANY; <sup>2</sup>Bayer HealthCare, Berkeley, CA, USA
- 5:50 pm L-221 **Membrane and Monolithic Chromatography: An Experimental and Theoretical Analysis to Assess their use in Large Scale Applications.** Simone Dimartino<sup>1</sup>, M. Omon Herigstad<sup>2</sup>, Cristiana Boi<sup>3</sup>, Giulio C. Sarti<sup>3</sup>, <sup>1</sup>Biomolecular Interaction Centre BIC, University of Canterbury, Christchurch, NEW ZEALAND; <sup>2</sup>Abbott Bioresearch Centre, Worcester, MA, USA; <sup>3</sup>Dipartimento di Ingegneria Chimica Mineraria e delle Tecnologie Ambientali DICMA Alma Mater Studiorum Università di Bologna, Bologna, ITALY
- 6:10 pm **PAUSE**

## 8B. ALTERNATIVES TO SOLID STATIONARY PHASES

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Meeting Location: President's Ballroom B (entrance located back left side of exhibit hall)  
Chair: Andreas Seidel-Morgenstern, Max-Planck Institute

- 5:10 pm L-222 **Active Pharmaceutical Ingredient Recovery from Pharmaceutical Waste Streams by High Performance Counter-current Chromatography and Intermittent Counter-current Extraction.** Svetlana Ignatova<sup>1</sup>, Nathalie Douillet<sup>2</sup>, Peter Hewitson<sup>1</sup>, Chris Thickitt<sup>2</sup>, Elsa Vilminot<sup>2</sup>, David Johns<sup>2</sup>, Keith Freebairn<sup>2</sup>, Ian Sutherland<sup>1</sup>, Neil Edwards<sup>3</sup>, Guy Harris<sup>4</sup>, Lee Janaway<sup>3</sup>, Philip Wood<sup>3</sup>, David Keay<sup>3</sup>, Ben Mathews<sup>5</sup>, <sup>1</sup>Brunel University, West London, UK; <sup>2</sup>GlaxoSmithKline, Stevenage, UK; <sup>3</sup>Dynamic Extractions Ltd, Slough, UK; <sup>4</sup>Dynamic Extractions Inc., Monmouth, NJ, USA; <sup>5</sup>Pfizer, Sandwich, UK
- 5:30 pm L-223 **Separation of a Binary Mixture using a Novel Continuous Liquid-liquid Chromatographic Unit.** Elisabeth Hopmann, Johannes Goll, Wolfgang Arlt, Mirjana Minceva, Friedrich-Alexander University Erlangen-Nuremberg, Erlangen, GERMANY
- 5:50 pm L-224 **A Practical Approach for Low-level Impurity Isolations to Support Drug Development.** Leo Hsu, Xiqin Yang, Sheng Tang, Kaina Jiang, GSK, King of Prussia, PA, USA
- 6:10 pm **PAUSE**

8:00 am – 4:00 pm **SYMPOSIUM REGISTRATION OPEN**

Location: Courtyard Reception Area

**9. CONTINUOUS CHROMATOGRAPHY NEW DEVELOPMENTS, MODELING AND OPTIMIZATION**

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Meeting Location: President's Ballroom A

Chair: Massimo Morbidelli, ETH Zürich

- 8:20 am L-301 **Intermittent SMB Chromatography for Chiral Ternary Separation – Experiments and Simulations.** Simon Jermann, Marco Mazzotti, ETH Zürich, Zürich, SWITZERLAND
- 8:40 am L-302 **Separation of  $\alpha$ -Noscipine Enantiomers using the Simulated Moving Bed Chromatography.** Ju Weon Lee<sup>1</sup>, Zoltan Horvath<sup>1</sup>, Oliver Böhm<sup>2</sup>, Dieter Schinzer<sup>2</sup>, Andreas Seidel-Morgenstern<sup>1</sup>, <sup>1</sup>Max-Planck-Institute for Dynamics of Complex Technical Systems, Magdeburg, GERMANY; <sup>2</sup>MOLISA GmbH, Magdeburg, GERMANY
- 9:00 am L-303 **Resolution of a Chiral Racemate by Batch Chromatography, Batch Chromatography with Recycle, and Two-column Semi-continuous Simulated Moving Bed.** Ricardo Silva, Rui Rodrigues, José Mota, Requite/CQFB, Caparica, PORTUGAL
- 9:20 am L-304 **Integrated Operation of SMB Enantioseparation and Racemization for the High-yield Production of Amino Acids.** Markus Fueerer, Christian Femmer, Matthias Bechtold, Sven Panke, ETH Zürich, Basel, SWITZERLAND
- 9:40 am L-305 **Influence of Solvent Composition on Chiral Separation of Flurbiprofen and Ketoprofen Enantiomers using Simulated Moving Bed Chromatography.** António Ribeiro<sup>1</sup>, Pedro Sá Gomes<sup>2</sup>, Luís Pais<sup>1</sup>, Alírio Rodrigues<sup>2</sup>, <sup>1</sup>Polytechnic Institute of Bragança, Bragança, PORTUGAL; <sup>2</sup>Faculty of Engineering, University of Porto, Porto, PORTUGAL
- 10:00 am L-306 **Rapid Process Development for Simulated Moving Bed Chromatography Utilizing Transient Experimental Data.** Jason Bentley, Yoshiaki Kawajiri, Georgia Institute of Technology, Atlanta, GA, USA
- 10:20 am **PRESENTATION OF AWARDS TO WINNERS OF THE BEST POSTER COMPETITION**  
Poster Sessions Chair: Kathleen Mihlbachler
- 10:30 am **PAUSE**

**10. BIOPROCESS APPLICATIONS - II**

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Meeting Location: President's Ballroom A

Chair: David Robbins, MedImmune

- 10:50 am L-307 **Critical Steps in the Rapid Development and Transfer of a Simple, Effective, and Robust Phase 3 Purification Process for a Challenging Monoclonal Antibody.** Hong Shen<sup>1</sup>, Mike Wineburg<sup>1</sup>, Scott Jarvis<sup>1</sup>, Shant Shahinian<sup>1</sup>, Raphael Bertrand<sup>1</sup>, Meredith Rice<sup>1</sup>, Doreen Gill<sup>1</sup>, Matthew Bailley<sup>1</sup>, Bin Lin<sup>1</sup>, Jackie Ryan<sup>2</sup>, McCarthy Barry<sup>2</sup>, Pedro Alfonso<sup>1</sup>, Ben Bulthuis<sup>1</sup>, Patricia Alred<sup>1</sup>, <sup>1</sup>Johnson & Johnson Pharmaceutical Research and Development LLC, Malvern, PA, USA; <sup>2</sup>Janssen Biologics Ireland, Cork, IRELAND
- 11:10 am L-308 **Comparison of Two Cation-exchange Chromatography Media Performances for Capturing an E. coli Protein as a Capture Column.** Ji Zheng, Phillip Nguyen, Ronald Bates, Allergan Inc., Irvine, CA, USA
- 11:30 am L-309 **Multiple-injection Technique for Isolating a Target Protein from Multicomponent Mixtures.** Wojciech Marek, Wojciech Piatkowski, Dorota Antos, Rzeszow University of Technology, Rzeszow, POLAND
- 11:50 am L-310 **CHROM<sup>2</sup> - Model Based Optimization of Innovative Process Concepts for Chromatographic Purification Processes.** Mayuratheepan Puthirasigamany<sup>1</sup>, Daniel Hasskerl<sup>1</sup>, Tim Zeiner<sup>1</sup>, Peter Kreis<sup>2</sup>, Andrzej Górak<sup>1</sup>, <sup>1</sup>TU Dortmund, Dortmund, GERMANY; <sup>2</sup>TU Dortmund/ Evonik Degussa GmbH, Marl, GERMANY
- 12:10 pm L-311 **Cycle to Cycle Model Predictive Control in Continuous Chromatography (MCSGP).** Martin Krättli, Guido Ströhlein, Massimo Morbidelli, ETH Zürich, Zürich, SWITZERLAND
- 12:30-2:00 pm **PAUSE**

**11. KEYNOTE: SUPERCRITICAL FLUID CHROMATOGRAPHY (SFC) - 1**

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Meeting Location: President's Ballroom A

Chairs: Terry Berger, AuroraSFC, & Christopher Welch, Merck & Co., Inc.

- 2:00 pm L-312 **Role of Mobile Phase Density in Controlling Supercritical Fluid Chromatographic (SFC) Performance – an Analysis.** Georges Guiochon, Abhijit Tarafder, University of Tennessee, Knoxville, TN, USA
- 2:20 pm L-313 **A Study of Injection Strategies on Separation Efficiency and Productivity in Preparative Supercritical Fluid Chromatography.** Keng Hong Goh, Arvind Rajendran, Nanyang Technological University, Singapore, SINGAPORE
- 2:40 pm L-314 **Use of Ammonium Hydroxide as an Additive in Super Critical Fluid Chromatography (SFC) for Achiral and Chiral Separations and Purifications of Small, Basic Medicinal Molecules.** Chris Hamman, Mengling Wong, Michael Hayes, Genentech, S. San Francisco, CA, USA
- 3:00 pm L-315 **Preparative Supercritical Fluid Chromatography (SFC) to Support Pharmaceutical Process Chemistry Development.** Jimmy DaSilva, Merck Research Laboratories, Rahway, NJ, USA
- 3:20 pm **PAUSE**

**12. KEYNOTE: SUPERCRITICAL FLUID CHROMATOGRAPHY (SFC) - 2**

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Meeting Location: President's Ballroom A

Chairs: Jimmy DaSilva, Merck Research Laboratories, & Christopher Welch, Merck & Co., Inc.

- 3:40 pm L-316 **Recent Advances in Analytical Scale SFC in Support of Semi-Preparative SFC.** Terry A. Berger, Aurora SFC Systems, Redwood City, CA, USA
- 4:00 pm L-317 **Use of Isopycnic Plots in Designing Operations of Supercritical Fluid Chromatography (SFC).** Abhijit Tarafder, Georges Guiochon, University of Tennessee, Knoxville, TN, USA
- 4:20 pm L-318 **Improvement of Column Loading on Preparative SFC by Optimization of Solvent Strength Profile on the System.** Ziqiang Wang, Chuping Luo, Waters Corporation, Newark, DE, USA
- 4:40 pm **ADJOURN**

# Monday Poster Presentations

Monday Poster Session I Times: 2:00 – 3:25 PM

- P-101 **Countercurrent Tangential Chromatography for Large-Scale Purification of High Value Proteins.** Oleg Shinkazh<sup>1</sup>, Andrew Zydney<sup>2</sup>, <sup>1</sup>Chromatan Corporation, Dedham, MA, USA; <sup>2</sup>Penn State University, University Park, PA, USA
- P-102 **Effects of Polymeric Surface Extenders on Protein Adsorption and Transport in Cation Exchangers Based on a Rigid Backbone Matrix.** Ernie Perez Almodovar, Yinying Tao, Giorgio Carta, University of Virginia, Charlottesville, VA, USA
- P-103 **A Novel High Capacity Protein A Resin.** Anders Ljunglof, Elin Monie', Kjell Eriksson, GE Healthcare, Uppsala, SWEDEN
- P-104 **Novel Functional Chromatographic Supports: from Preparation to Application.** Alexandros Lamprou<sup>1</sup>, Agni Faviola Mika Gavriilidou<sup>2</sup>, Giuseppe Storti<sup>1</sup>, Miroslav Soos<sup>1</sup>, Massimo Morbidelli<sup>1</sup>, <sup>1</sup>ETH Zürich, Zürich, SWITZERLAND; <sup>2</sup>Aristotle University of Thessaloniki, Thessaloniki, GREECE
- P-105 **Model Calibration of Chromatographic Separation of Rare Earth Elements.** Frida Ojala, Niklas Borg, Bernt Nilsson, Department of Chemical Engineering Lund University, Lund, SWEDEN
- P-106 **Determination of Surface Heterogeneity by Multiple-site BET Isotherms.** Krisztian Horvath<sup>1</sup>, Peter Vajda<sup>2</sup>, Attila Felinger<sup>2</sup>, Peter Hajos<sup>1</sup>, <sup>1</sup>University of Pannonia, Veszprem, HUNGARY; <sup>2</sup>University of Pecs, Pecs, HUNGARY
- P-107 **Two-Dimensional Preparative LC/LC/MS Approach for Complex Sample Purification.** Catherine Pham, Yinong Zhang, Lu Zeng, Rongda Xu, Daniel Kassel, Takeda San Diego Inc., San Diego, CA, USA
- P-108 **Mobile Phase Modulator (PEG) for Improving the Protein Separation by Electrostatic Interaction Chromatography.** Shuichi Yamamoto, Wataru Saitoh, Daisuke Itoh, Megumi Seo, Noriko Yoshimoto, Yamaguchi University, Yamaguchi, JAPAN
- P-109 **Cost-effective Purification of High Value-added Compounds in Reversed-phase Chromatography Achieved by using Novel Organic/inorganic Hybrid Silica-based Packing Material with High Mechanical and Chemical Stability.** Ernest J. Sobkow<sup>1</sup>, Masakatsu Omote<sup>2</sup>, Takatomo Takai<sup>2</sup>, Noriko Shoji<sup>2</sup>, Takashi Sato<sup>2</sup>, Naohiro Kuriyama<sup>2</sup>, <sup>1</sup>YMC America Inc., Allentown, PA, USA; <sup>2</sup>YMC Co. Ltd., Kyoto, JAPAN
- P-110 **SMB Processes: Comparison of Equilibrium Model and General Rate Model Predicted Concentration Profiles for Nonlinear Isotherms.** Gonca Saglam, Ahmet Özdural, Hacettepe University, Ankara, TURKEY
- P-111 **Evaluation of a Novel Anion Exchange Chromatography Resin.** Dwight Winters, Amir Porat, Ling Cai, Randy Hecht, Amgen, Thousand Oaks, CA, USA
- P-112 **The Development of a Low pH Virus Inactivation Step During Cation Exchange Chromatography.** David Gruber, Richard Turner, MedImmune, Cambridge, UK
- P-113 **Kromasil 300Å: A Versatile Platform for the Separation of Biomolecules.** Sylvia Winkel Pettersson, Joakim Höglblom, Fredrik Limé, AkzoNobel, Bohus, SWEDEN
- P-114 **Using an Acetonitrile Mixture as a Polar Modifier in Normal-Phase Chiral HPLC Purifications.** Natascha Bezdenejnih-Snyder, Valerie Hoesch, Milena Virrankoski, Nancy DeGrace, AstraZeneca, Waltham, MA, USA

# Monday Poster Presentations

Monday Poster Session I Times: 2:00 – 3:25 PM

- P-115 **Development of a Sample Preparation Procedure for Profiling Residual Host Cell Proteins in Purified Monoclonal Antibodies.** Wai Keen Chung, Dhara Mandavia, Min Zhu, David Robbins, Process Biochemistry MedImmune, Gaithersburg, MD, USA
- P-116 **New High Capacity Anion Exchanger for Bioprocessing.** Jiali Liao, Yueping Xu, Xuemei He, Paul Ng, Mohsen Navvab, Randy Jacinto, Lee Olech, Russ Frost, Hong Chen, Bio-Rad Labs, Hercules, CA, USA
- P-117 **Upstream and Downstream Process Integration to Control Deamidation Levels of a Monoclonal Antibody - A Case Study.** Saravanamoorthy Rajendran, Dhara Mandavia, Jessica Prentice, Diemchi Vu, Methal Albarghouthi, Chun Chen, Sanjeev Ahuja, Guillermo Miro-Quesada, Yuan Chang, David Robbins, MedImmune, Gaithersburg, MD, USA
- P-118 **Carousel Chromatographic System for Bioseparations.** Dorota Antos, Roman Bochenek, Wojciech Marek, Wojciech Piatkowski, Rzeszow University of Technology, Rzeszow, POLAND
- P-119 **Purification of Plasmid DNA from Clarified Cell Lysates by a Single Chromatographic Step using Berenil as Ligand.** Catarina Nunes<sup>1</sup>, Marta Gabriel<sup>1</sup>, Paulo Almeida<sup>2</sup>, João Marcos<sup>3</sup>, Cândida Tomaz<sup>1</sup>, <sup>1</sup>CICS-UBI – Health Sciences Research Centre University of Beira Interior; Department of Chemistry University of Beira Interior, Covilha, PORTUGAL; <sup>2</sup>Department of Chemistry University of Beira Interior, Covilha, PORTUGAL; <sup>3</sup>Center of Chemistry University of Minho Campus de Gualtar, Braga, PORTUGAL
- P-120 **Preparative Separation and Purification of Epigallocatechin Gallate from Green Tea Extracts using Silica Adsorbents Containing Beta-Cyclodextrin.** Shih-Ming Lai, Wen-Lung Lee, Bing-Hao Huang, Jhe-Yu Gu, National Yunlin University of Science and Technology, Douliu City, TAIWAN
- P-121 **Preparative Separation of Omeprazole: Predictions of the Optimal Experimental Conditions by Computer Simulations.** Martin Enmark, Jörgen Samuelsson, Patrik Forssen, Torgny Fornstedt, Karlstad University, Karlstad, SWEDEN
- P-122 **A Deeper Investigation of Strange Preparative Band Shapes of a Simple Racemic Solute on tris-(3, 5-dimethylphenyl)carbamoyl Cellulose as Chiral Stationary Phase.** Martin Enmark, Jörgen Samuelsson, Torgny Undin<sup>1</sup>, Torgny Fornstedt, Karlstad University, Karlstad, SWEDEN; <sup>1</sup>Uppsala University, Uppsala, SWEDEN
- P-123 **Understanding Protein Adsorption in Multimodal Chromatographic Systems.** Melissa A. Holstein, Ying Hou, Siddharth Parimal, Alexander S. Freed, Scott A. McCallum, Steven M. Cramer, RPI, Troy, NY, USA
- P-124 **Buffer Effects on Column Efficiency.** Travis Holle, Cook Pharmica, LLC, Bloomington, IN, USA
- P-125 **Flash Chromatography on Cartridges for the Separation of Plant Extracts.** Olivier Potterat<sup>1</sup>, Nina Schafroth<sup>2</sup>, Matthias Hamburger<sup>1</sup>, Brigitte Pichon<sup>2</sup>, <sup>1</sup>University of Basel, Basel, SWITZERLAND; <sup>2</sup>BUCHI Labortechnik AG, Flawil, SWITZERLAND
- P-126 **iNOS Inhibition Reduces Therapeutic Effects of Ozone in Acute Necrotizing Pancreatitis.** Yesim Oztas, Bulent Uysal, Umit Kaldirim, Yavuz Poyrazoglu, Mehmet Yasar, Tuncer Cayci, Yavuz Cekli, Serdar Sadir, Mehmet Ozler, Turgut Topal, Sukru Oter, Ahmet Korkmaz, Hacettepe University, Ankara, TURKEY
- P-127 **Development of an Automated High Performance Countercurrent Chromatography (HPCCC) Centrifuge Platform.** James Bradow<sup>1</sup>, Frank Riley<sup>1</sup>, Guy Harris<sup>2</sup>, <sup>1</sup>Pfizer, Groton, CT, USA; <sup>2</sup>Dynamic Extractions Inc., Monmouth Junction, NJ, USA

# Monday Poster Presentations

Monday Poster Session I Times: 2:00 – 3:25 PM

- P-128 **Use of Dextran Sulfate to Minimize Precipitation during Protein A Affinity Chromatography.** Mi Jin, Cherie Strain, Jennifer Zhang, Siegfried Rieble, Shih-hsie Pan, Sanchayita Ghose, Bristol-Myers Squibb Company, Syracuse, NY, USA
- P-129 **Development of a Semi-Synthetic Antibody Binding Protein using Phage Display and Directed Evolution.** Justin Weaver, Ranil Wickramasinghe, Colorado State University, Fort Collins, CO, USA
- P-130 **Pilot Scale Continuous Enrichment of Aloe Vera Extract by TMB CPC/CCC.** Gregoire Audo, Celine Le Quemener, Armen instrument, Saint Ave, 56890, FRANCE
- P-131 **Utilizing High Throughput Screening Methods to Rapidly Develop, Optimize and Scale Up Protein A Process to Remove Mis-folds Aggregates and Fragments for Fc Fusion Protein.** Ijeoma Ikechukwu, Joseph Nti-Gyabaah, David Roush, Thomas Linden, Merck & Co. Inc., Rahway, NJ, USA
- P-132 **Comprehensive and Intuitive Simulation Software for Continuous Chromatography Process Design.** Soo Kim<sup>1</sup>, Sung Yoon<sup>1</sup>, Jan Hoogendoorn<sup>2</sup>, <sup>1</sup>ChromWorks, Norwood, MA, USA; <sup>2</sup>Jan Hoogendoorn Consultancy, Huizen, THE NETHERLANDS
- P-133 **A Novel Phosphorylcholine-bonding Silica Stationary Phase PC HILIC: An Alternative Approach from Analytical HPLC to Preparative Chromatography for the Analysis of Hydrophilic Compounds.** Xiaomi Xin<sup>1</sup>, Taketoshi Kanda<sup>2</sup>, Hideki Takasaki<sup>3</sup>, Isao Yanagisawa<sup>1,2</sup>, Shiseido Research Center, Yokohama, JAPAN; <sup>3</sup>Shiseido Frontier Science Business Division, Kyoto, JAPAN; <sup>1</sup>Shiseido Frontier Science Business Division, Tokyo, JAPAN
- P-134 **Application of the Triangle Theory to Steady State Recycling: Preliminary Findings.** Charles M. Grill, Pfizer Inc, Groton, CT, USA
- P-135 **Fluorescence Studies of Exchange and Transport of Sorbed Protein in Polymer-Modified and Traditional Strong Cation-Exchange Resins.** Steven J. Traylor, Brian D. Bowes, Steven M. Timmick, Abraham M. Lenhoff, University of Delaware, Newark, DE, USA
- P-136 **Development of a Novel Affinity Adsorbent as a Platform Process for Albumin Fusion Proteins.** Bastiaan Lobbezoo<sup>1</sup>, Richard Dodd<sup>1</sup>, Phil Morton<sup>2</sup>, Michael Duell<sup>1</sup>, <sup>1</sup>ProMetic BioSciences Ltd., Cambridge, UK; <sup>2</sup>Novozymes Biopharma, Cambridge, MA, USA
- P-137 **A New Mixed-Mode Chromatography Media for the Purification of Monoclonal Antibodies and Recombinant Proteins.** Xuemei He, Jiali Liao, Russ Frost, Bio-Rad Laboratories, Hercules, CA, USA
- P-138 **Ion-exchange Centrifugal Partition Chromatography for Peptide Purification.** Leslie Boudesocque<sup>1</sup>, Nassima Amarouche<sup>2</sup>, Pédro Lameiras<sup>2</sup>, Jean-Marc Nuzillard<sup>2</sup>, Romain Kapel<sup>3</sup>, Ivan Marc<sup>3</sup>, Francesca Quattrini<sup>1</sup>, Alessandro Butte<sup>1</sup>, Matthieu Giraud<sup>1</sup>, John McGarrity<sup>1</sup>, Jean-Hugues Renault<sup>2</sup>, <sup>1</sup>Lonza AG, Visp, SWITZERLAND; <sup>2</sup>University of Reims, Reims, FRANCE; <sup>3</sup>University of Nancy, Nancy, FRANCE
- P-139 **Practical Strategies for Scouting Pall BioSeptra Mixed Mode HyperCel Chromatography Sorbents: Case Studies Utilizing 1mL PRC (prepacked) Columns.** Eric Gershenow, Pall Corporation, Philadelphia, PA, USA
- P-140 **Comparison of Streamlined, Two-column, Simulated Moving-bed Processes.** Rui C. R. Rodrigues, Ricardo J. S. Silva, José P. B. Mota, FCT/UNL, Quinta da Torre, Caparica, PORTUGAL

# Monday Poster Presentations

Monday Poster Session I Times: 2:00 – 3:25 PM

- P-141 **Single-Use Simulated Moving Bed Chromatography for the Purification of Monoclonal Antibodies.** Alexandra Buttke, Mark Brower, Nihal Tugcu, David Pollard, Merck Research Laboratories, Rahway, NJ, USA
- P-142 **High Capacity Two-column MAb Purification Process with Streamlined Buffer System.** Marc Schrader, Helen Yang, Tia Chudzik, Wen Chung Lim, Michael Huang, Diane Dong, Stephen Lu, Natraj Ram, Abbott Bioresearch Center, Worcester, MA, USA
- P-143 **The Use of Dynamic Light Scattering (DLS) Analysis to Aid in the Development of Nanofiltration Operation Parameters.** David Vincent, Karen Bannister, Richard Turner, MedImmune, Cambridge, UK
- P-144 **Magnetic Solid-phase Extraction of Explosive RDX in Environmental Aqueous Samples by a Core/Shell Magnetic Molecularly Imprinted Polymer Nanocomposite.** Chun-Chieh Tseng, Department of Chemistry, National Kaohsiung Normal University, Kaohsiung, TAIWAN
- P-145 **Increased Asymmetric Dimethylarginine (ADMA) Concentrations in Plasma of Male Patients with Schizophrenia.** Cemil Celik<sup>1</sup>, Tuncer Cayci<sup>2</sup>, Barbaros Ozdemir<sup>1</sup>, Serkan Zincir<sup>1</sup>, Adem Balikci<sup>1</sup>, Ozcan Uzun<sup>1</sup>, Halil Yaman<sup>2</sup>, <sup>1</sup>GATF Department of Psychiatry, Ankara, TURKEY; <sup>2</sup>GATF Department of Biochemistry, Ankara, TURKEY

## Tuesday Poster Presentations

Tuesday Poster Session II Times: 2:00 – 3:25 PM

- P-201 **New High Resolution Ion Exchange Resins for Polishing.** Annika Forss. Tryggve Bergander, Eggert Brekkan, Katarina Oberg, Kjell Eriksson, GE Healthcare, Uppsala, SWEDEN
- P-202 **Determination of Lysozyme Throughput and Yield on Nylon-6 Capillary-Channeled Polymer (C-CP) Fibers by Ion Exchange Chromatography.** K. Manoj Randunu, R. Kenneth Marcus, Clemson University, Clemson, SC, USA
- P-203 **The Role of Supercritical Fluid Chromatography in Medicinal Chemistry Purifications.** Shuping Dong, Leah Aquilani, Ronald Brasch, Jeffry Boehm, Tindy Li, James Challahan, GlaxoSmithKline, King of Prussia, PA, USA
- P-204 **Model-based Rational Strategy for Chromatographic Resin Selection.** Beckley Nfor<sup>1</sup>, Diego Zuluaga<sup>1</sup>, Marc Noverraz<sup>1</sup>, Sreekanth Chilamkurthi<sup>1</sup>, Peter Verhaert<sup>1</sup>, Luuk van der Wielen<sup>1</sup>, Emile van de Sandt<sup>2</sup>, Bas Kokke<sup>3</sup>, Marcel Ottens<sup>1</sup>, <sup>1</sup>Delft University of Technology, Delft, THE NETHERLANDS; <sup>2</sup>DSM Biotech Centre, Delft, THE NETHERLANDS; <sup>3</sup>MSD, Oss, THE NETHERLANDS
- P-205 **Separation and Regeneration Regions Analysis of the OSS - Simulated Moving Bed Non-conventional Operating Mode.** Pedro Sá Gomes<sup>1</sup>, Alírio Rodrigues<sup>2</sup>, <sup>1</sup>Faculty of Engineering of University of Porto, Porto, PORTUGAL; <sup>2</sup>Faculty of Engineering of the University of Porto, Porto, PORTUGAL
- P-206 **Experimental Evidence of a Delta-shock in Nonlinear Chromatography.** Simon Jermann<sup>1</sup>, Arvind Rajendran<sup>2</sup>, Marco Mazzotti<sup>1</sup>, <sup>1</sup>ETH Zürich, Zürich, SWITZERLAND; <sup>2</sup>Nanyang Technological University, Singapore, SINGAPORE
- P-207 **How to Save Capital Investment, Resin Costs, and Enable Higher Throughput Per Square Foot of Manufacturing Space.** Fredrik Limé, Joakim Höglblom, Sylvia Winkel Pettersson, AkzoNobel, Bohus, SWEDEN
- P-208 **Closely Related Compounds with “One Particle-multiple Resins” Stationary Phases in HPLC.** Fredrik Limé, Maria Forsberg, Joakim Höglblom, Eka Chemicals AB, Bohus, SWEDEN
- P-209 **Packing Ceramic Hydroxyapatite in AxiChrom™ Columns.** Shaun Grier, Prabhakar Veeravelli, Bee Lin Cheang, Eric Mueller, Igor Quinones, Shire, Cambridge, MA, USA
- P-210 **Improving the Productivity of Protein A Chromatography.** Richard Tran, Karen Bannister, Richard Turner, MedImmune, Cambridge, UK
- P-211 **A Newly Developed Hydrophilic Polymer-based Ion exchange Chromatography Media and Purification for Immunoglobulin Y from Egg Yolk.** Ernest J. Sobkow<sup>1</sup>, Masakatsu Omote<sup>2</sup>, Noriko Shoji<sup>2</sup>, Takashi Sato<sup>2</sup>, Naohiro Kuriyama<sup>2</sup>, <sup>1</sup>YMC America Inc., Allentown, PA, USA; <sup>2</sup>YMC Co. Ltd., Kyoto, JAPAN
- P-212 **A-priori Selection of the Mobile and Stationary Phase in Centrifugal Partition Chromatography.** Elisabeth Hopmann, Andreas Frey, Wolfgang Arlt, Mirjana Minceva, Friedrich-Alexander University Erlangen-Nuremberg, Erlangen, GERMANY
- P-213 **Automated Parallel Chromatographic Separations in Process Development.** Tim Schroeder, Jürgen Friedle, Atoll GmbH, Weingarten, GERMANY
- P-214 **Performance Comparison Between Two Technology Platforms for Packing Compressible Chromatography Media.** Eric Mueller, Bee Lin Cheang, Hemanth Kaligotla, Igor Quinones-Garcia, Shire HGT, Cambridge, MA, USA

## Tuesday Poster Presentations

Tuesday Poster Session II Times: 2:00 – 3:25 PM

- P-215 **Comparison of Multi-component Adsorption Equilibrium and Kinetics of mAb Charge Variants on Macroporous and Dextran-Grafted Cation Exchangers.** Yinying Tao<sup>1</sup>, Giorgio Carta<sup>1</sup>, Gisela Ferreira<sup>2</sup>, David Robbins<sup>2</sup>, <sup>1</sup>University of Virginia, Charlottesville, VA, USA; <sup>2</sup>MedImmune, Gaithersburg, MD, USA
- P-216 **Separation of Monoclonal Antibody Aggregates on Nuvia S™ a Strong Cation Exchanger.** Cheryl Aberin, Mark Snyder, Bio-Rad Laboratories, Hercules, CA, USA
- P-217 **Evaluation of New Chiral Stationary Phases for Supercritical Fluid Chromatography Applications.** Jeffrey Kiplinger<sup>1</sup>, Paul Lefebvre<sup>1</sup>, Michael Rego<sup>1</sup>, Matt Przybyciel<sup>2</sup>, David Kohler<sup>2</sup>, <sup>1</sup>Averica Discovery Services, Worcester, MA, USA; <sup>2</sup>ES Industries, West Berlin, NJ, USA
- P-218 **Feasibility of Employing SFC for the Rapid Purification of Radiolabeled Imaging Agents with Short Half Lives.** John McCauley, Andy Aubin, Harbaksh Sidhu, Rui Chen, Waters Corporation, New Castle, DE, USA
- P-219 **Separation of the Four Most Important Latex Allergens from Latex Gloves using Hydrophobic Interaction Chromatography.** Marta Gabriel<sup>1</sup>, Célia Peixinho<sup>1</sup>, Paulo Tavares-Ratado<sup>2</sup>, Cândida Tomaz<sup>1</sup>, <sup>1</sup>CICS-UBI – Health Sciences Research Centre University of Beira Interior; Department of Chemistry University of Beira Interior, Covilha, PORTUGAL; <sup>2</sup>CICS-UBI – Health Sciences Research Centre University of Beira Interior; Department of Health Sciences University of Beira Interior; Laboratory of Clinical Pathology Sousa Martins Hospital, Covilha/Guarda, PORTUGAL
- P-220 **Study of Mixed-mode Chromatographic Materials: Material Characterization and Performance Evaluation in Peptides Separation.** David Gétaz<sup>1</sup>, Susanna Bernardi<sup>2</sup>, Nicola Forrer<sup>3</sup>, Massimo Morbidelli<sup>1</sup>, <sup>1</sup>ETH Zürich, Zürich, SWITZERLAND; <sup>2</sup>Politecnico di Milano, Milan, ITALY; <sup>3</sup>Zeochem AG, Uetikon, SWITZERLAND
- P-221 **Some Operational Conditions Often Neglected in Numerical Optimization of Preparative Chromatography.** Jörgen Samuelsson, Martin Enmark, Patrik Forssen, Torgny Fornstedt, Department of Chemistry and Biomedical Sciences Karlstad University, Karlstad, SWEDEN
- P-222 **Recent Experimental and Methodological Improvements on the Elution by Characteristic Points Method for Rapid Characterization of Preparative Phases.** Jörgen Samuelsson, Torgny Undin<sup>1</sup>, Torgny Fornstedt, Karlstad University, Karlstad, SWEDEN; <sup>1</sup>Uppsala University, Uppsala, SWEDEN
- P-223 **Pressure-Flow Experiments and Modeling for Scale-Up of a Mixed Mode Chromatography Column for Biopharmaceutical Manufacturing.** Steven Evans, Tolulope Ogunsola, Diemchi Vu, MedImmune, Brad Matanin, John Higgins, Gisela Ferreira, MedImmune, Gaithersburg, MD, USA
- P-224 **Automated High Throughput Purification Platform: A Critical Component of the Drug Discovery Value Chain.** Min Liu, John Athanasopoulos, Kuanchang Chen, Denny Christian, Tazeen Fatima, Natalya Pissarnitski, Eric Streckfuss, Chaowei Zhang, Zhicai Shi, Petr Vachal, Jim Tata, Ann Weber, Merck & Co., Inc., Rahway, NJ, USA
- P-225 **Calcium Supplementation: A Simple Alternative to Increase CHT Packed Bed Lifetime.** Esteban Freydel, Jie He, Larry Cummings, Mark Snyder, Bio-Rad Laboratories, Hercules, CA, USA
- P-226 **Identification of 6D5 Monoclonal Antibody Target, A New Candidate Marker for Hepatocellular Carcinoma.** Emin Oztas<sup>1</sup>, Mehmet Ender Avci<sup>2</sup>, Bilkent Tamer Yagci<sup>2</sup>, <sup>1</sup>Gulhane Military Medical Academy, Ankara, TURKEY; <sup>2</sup>Bilkent University, Ankara, TURKEY

## Tuesday Poster Presentations

Tuesday Poster Session II Times: 2:00 – 3:25 PM

- P-227 **Industrial Application of the Green Subcritical Water Chromatography.** Brahmam Kapalavavi<sup>1</sup>, Leena Gujjar<sup>1</sup>, Ronita Marple<sup>2</sup>, Chris Gamsky<sup>2</sup>, Yu Yang<sup>1</sup>, <sup>1</sup>East Carolina University, Greenville, NC, USA; <sup>2</sup>Procter & Gamble, Cincinnati, OH, USA
- P-228 **Improved Rapamycin Chromatographic Purification Using Dynamic Axial Compression (DAC) Technology.** Li Sun, Jiten Shah, Sanjay Chemburkar, Vimal Kishore, Abbott Laboratories, North Chicago, IL, USA
- P-229 **Examination of Commercial Anion-Exchange Membrane Adsorbers for Use in Biopharmaceutical Drug Purification.** Justin Weaver<sup>1</sup>, Scott Husson<sup>2</sup>, Ranil Wickramasinghe, <sup>1</sup>Colorado State University, Fort Collins, CO, USA; <sup>2</sup>Clemson University, Clemson, SC, USA
- P-230 **Application of a Mixed-mode Resin for IgG Purification.** Koji Nakamura, Kazuaki Muranaka, Yuji Kubo, Hiroyuki Moriyama, Tosoh, Separation Center, Yamaguchi, JAPAN
- P-231 **Prediction of Protein A Chromatography Performance by using a 96-well Format Micro-plate and Very Small Columns.** Yuki Suehiro, Kazunobu Minakuchi, Noriko Yoshimoto, Shuichi Yamamoto, Yamaguchi University, Yamaguchi, JAPAN
- P-232 **Selectivity Choices for Chiral Method Development and Scale-Up in SFC.** Ted Szczerba, Jelena Kocergin, Aleksandra Marinkovic, Regis Technologies, Morton Grove, IL, USA
- P-233 **Designing a Chiral Separation to Minimize Impurity Carryover.** James Falabella, Konstantinos Dambalas, Ehrlic Lo, Akin Davulcu, Olav Lyngberg, Bristol-Myers Squibb, New Brunswick, NJ, USA
- P-234 **Optimization of Protein Purification using Automated Small-scale Separation Columns.** Renee Tobias, Lee Hoang, Chris Suh, Doug Gjerde, PhyNexus, San Jose, CA, USA
- P-235 **Intensified Synthesis of Fructooligosaccharides by Means of a Simulated Moving Bed Reactor.** Pedro Sá Gomes<sup>1,2</sup>, Paul I. Barton<sup>1</sup>, Alírio E. Rodrigues<sup>2</sup>, <sup>1</sup>Massachusetts Institute of Technology, Cambridge, MA, USA; <sup>2</sup>University of Porto, Porto, PORTUGAL
- P-236 **Removal of IgG aggregates using Anion Exchange Chromatography in Flow Through Mode.** Wei Guo, Mike Jendzeizyk, B. Thiyagarajan, Nandu Deorkar, Avantor, Phillipsburg, NJ, USA
- P-237 **Stimuli Responsive Resins as Novel Ion Exchange Resins for Protein Separation.** Netsanet Shiferaw Terefe<sup>1</sup>, Cheryl Taylor<sup>1</sup>, Li Hui Liu<sup>1</sup>, Olga Glagovskaia<sup>1</sup>, Bill Chong<sup>2</sup>, San Thang<sup>2</sup>, Brad Woonton<sup>3</sup>, Kirthi De Silva<sup>1</sup>, <sup>1</sup>CSIRO Food and Nutritional Sciences, Victoria, AUSTRALIA; <sup>2</sup>CSIRO Material Science and Engineering, Victoria, AUSTRALIA; <sup>3</sup>Mars Petcare, Wodonga, Victoria, AUSTRALIA
- P-238 **A New Multicolumn, Open-loop Process for Ternary Separation by Solvent-gradient Chromatography.** Rui C.R. Rodrigues<sup>1</sup>, José P. B. Silva<sup>1</sup>, Ricardo J. S. Mota<sup>1</sup>, Hector Osuna-Sanchez<sup>2</sup>, Eric Valéry<sup>2</sup>, <sup>1</sup>FCT/UNL, Quinta da Torre, Caparica, PORTUGAL; <sup>2</sup>NOVASEP Process, Pompey, Lorraine, FRANCE
- P-239 **Effect of Salt Concentration and Surface Functionality on the Energetics of Protein Adsorption on Mesostructured Cellular Foam Silica.** Jungseung Kim, Rebecca J. Desch, Stephen W. Thiel, Vadim Guliants, Neville G. Pinto, University of Cincinnati, Cincinnati, OH, USA
- P-240 **Nuvia S: A High Capacity Cation Exchanger for Process Purification of Monoclonal Antibodies.** Xuemei He, Jiali Liao, Christopher Foster, Kimberly Brisack, Cheryl Aberin, Mark Snyder, Bio-Rad Laboratories, Hercules, CA, USA

## Tuesday Poster Presentations

Tuesday Poster Session II Times: 2:00 – 3:25 PM

- P-241 **Intensified Extraction of Ionized Natural Products by Ion Pair Centrifugal Partition Extraction.** Mahmoud Hamzaoui<sup>1</sup>, Jane Hubert<sup>1</sup>, Jamila Hadj-Salem<sup>1</sup>, Luc Marchal<sup>2</sup>, Alain Foucault<sup>2</sup>, Jean-Marc Nuzillard<sup>1</sup>, Catherine Lavaud<sup>1</sup>, Jean-Hugues Renault<sup>1</sup>, <sup>1</sup>University of Reims, Reims, FRANCE; <sup>2</sup>University of Nantes, Saint-Nazaire, FRANCE
- P-242 **Buffer System Effects on Monoclonal Antibody Protein A Capture.** Wen Chung Lim, Linda Rich, Natarajan Ramasubramanyan, Diane Dong, Abbott Laboratories, Worcester, MA, USA
- P-243 **Experimental Study on Separation and Purification of an Intermediate Target out of a Ternary Mixture by SMB Chromatography.** Jadwiga Nowak<sup>1</sup>, Dorota Antos<sup>2</sup>, Andreas Seidel-Morgenstern<sup>1</sup>, <sup>1</sup>Max Planck Institute, Magdeburg, GERMANY; <sup>2</sup>Rzeszów University of Technology, Rzeszów, POLAND
- P-244 **Chromatographic Model Parameter Uncertainties as a Result of Experimental Error.** Niklas Borg<sup>1</sup>, Karin Westerberg<sup>1</sup>, Sebastian Schnittert<sup>2</sup>, Eric von Lieres<sup>2</sup>, Bernt Nilsson<sup>1</sup>, <sup>1</sup>Lund University, Lund, SWEDEN; <sup>2</sup>Institute of Bio- and Geosciences, Jülich, GERMANY
- P-245 **Serum Haptoglobin Levels in Patients with Melancholic and Nonmelancholic Major Depression.** Murat Erdem<sup>1</sup>, Cemil Celik<sup>1</sup>, Tuncer Cayci<sup>2</sup>, Barbaros Ozdemir<sup>1</sup>, Yasemin Gulcan Kurt<sup>2</sup>, Emin Ozgur Akgul<sup>2</sup>, Halil Yaman<sup>2</sup>, Adem Balikci<sup>1</sup>, Ozcan Uzun<sup>1</sup>, <sup>1</sup>GATF Department of Psychiatry, Ankara, TURKEY; <sup>2</sup>GATF Department of Biochemistry, Ankara, TURKEY

# Exhibitors

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Essential Life Solutions Ltd. has been serving the preparative and semi-preparative chromatography market since 1998. We offer a full range of HPLC/FPLC columns in glass and acrylic in diameters from 5mm (.196") up to 2 meter process columns; many are available for shipment from inventory.

# Exhibitors

## Leaders in the Preparative and Process Chromatography Arena

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### **FUJI SILYSIA CHEMICAL SA**

International Chromatography Business  
USA Chromatography Center  
N79W34485 Petersen Road, Oconomowoc, WI 53066, USA  
920-474-3432

[www.fuji-silysia.co.jp/english/index.html](http://www.fuji-silysia.co.jp/english/index.html)

Fuji Silysia Chemical is the largest producer of chromatography silica gel in Japan with an uninterrupted 12 ton/day production capacity to meet supply and delivery demands. FSC produces granular and spherical, normal or reverse phase, HILIC, ion-exchange, scavenger, and custom-bonded silica grades in a wide range of pore diameters and particle sizes for flash chromatography and HPLC.

### **GILSON, INC.**

P.O. Box 628098, Middleton, WI 53562, USA  
800-445-7661

[www.pipetman.com](http://www.pipetman.com)

Gilson, a leader in fluidics, purification and sample management, manufactures instrumentation and software that enables our customers to safely purify and accurately manipulate their valuable samples. Our current generation of automated liquid handling products, from Prep HPLC, SPE, and GPC Clean-up to our manual liquid handling products including the world's first adjustable volume pipette, PIPETMAN®, have been built upon our knowledge gained from manufacturing reliable equipment for over 50 years.

### **HITACHI HIGH TECHNOLOGIES AMERICA**

5100 Franklin Drive, Pleasanton, CA 94588, USA  
800-548-9001

[www.hitachi-hta.com](http://www.hitachi-hta.com)

The Life Science Group of Hitachi High Technologies America, Inc. (HTA) assists researchers in finding solutions to their scientific instrument requirements. We are committed to providing the highest quality scientific instruments to the North American market. We support thousands of satisfied customers with a wide range of reliability-proven analytical instrumentation, including HPLC/Preparative/Counter Current Chromatography systems, Amino Acid Analyzers, UV-Vis/NIR and Fluorescence Spectroscopy Systems, and LC/MS systems.

### **ITOCHU CHEMICALS AMERICA, INC.**

360 Hamilton Avenue, 6th Floor, White Plains, NY 10601, USA  
914-262-8785

[www.itochu-ca.com](http://www.itochu-ca.com)

Exclusive distributor of polymeric media manufactured by Mitsubishi Chemical Corporation (MCC). Branded product lines include ion exchange (DIAION®), and SEPABEADS Synthetic Adsorbent Technology media for pharmaceutical and biopharmaceutical applications. MCC advanced pore sizing and ligand technology includes polymethacrylate media for a large array of biopharmaceutical purifications. Itochu represents SPRIN in enzyme immobilization making biocatalysis a viable economical alternative for sustainable green chemistry and the extension of drug patent life.

# Exhibitors

## Leaders in the Preparative and Process Chromatography Arena

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### **JASCO**

28600 Mary's Court, Easton, MD 21601, USA  
800-333-5272 or 410-822-1220

[www.jascoinc.com](http://www.jascoinc.com)

JASCO offers over 50 years of experience within the academic, pharmaceutical, forensics, biotechnology, and industrial markets worldwide. JASCO's line for preparative chromatography includes a comprehensive range of systems for Preparative & Semi-Prep SFC/SFE and Semi-Prep & Preparative HPLC. We also offer systems for analytical SFC, HPLC and UHPLC. In addition, JASCO specializes in a full line of spectroscopy instrumentation, for more information, please visit [www.jascoinc.com](http://www.jascoinc.com).

### **LCGC NORTH AMERICA**

485 US Highway 1S, Suite 100, Iselin, NJ 08830, USA

[www.ChromatographyOnline.com](http://www.ChromatographyOnline.com)

2011 marks LCGC's 29th year of continuous publication. And although the market for separation science products has undergone dramatic changes since our debut as LC Magazine, our editorial commitment to our subscribers' informational needs remains constant. Comprehensive coverage of new products, new applications, and industry news secures LCGC's position as the must-read publication for more than 53,300 subscribers involved in the separation sciences.

### **LEWA, INC.**

132 Hopping Brook Road, Holliston, MA 01746, USA  
508-429-7403

[www.lewa.com](http://www.lewa.com)

Consulting and engineering for creative fluid solutions in the biopharmaceutical area for dosing and process technology and comprehensive service worldwide, high precision pumps, customized metering packages, validated packages, condition monitoring, high purity systems, buffer dilution systems and downstream processing modules. The LEWA Group with more than 15 affiliated companies and 90 representatives is worldwide at your service.

### **NOVASEP, INC.**

23 Creek Circle, Boothwyn, PA 19061, USA  
610-494-0447

[www.novasep.com](http://www.novasep.com)

Novasep is a leading provider of manufacturing solutions for the Life Science industries. Our offering includes process development services; purification solutions from lab to industrial scale through preparative chromatography (HPLC, SFC, MPLC, LPLC, continuous chromatography) and TFF cassettes and systems; and cGMP custom purification services from kg to multi-ton scale. We master a unique range of technologies to help you to identify the solution that best suits your purification challenges for both synthetic and bio-molecules.

# Exhibitors

## Leaders in the Preparative and Process Chromatography Arena

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### **PALL LIFE SCIENCES**

25 Harbor Park Drive, Port Washington, NY 11050, USA  
516-484-5400 or 800-717-7255

[www.pall.com](http://www.pall.com)

Pall Life Sciences' leading edge filtration, separation and purification technologies and services play a pivotal role in Biopharmaceutical Industry. In the laboratory, Pall products help facilitate the drug discovery and development process to get innovative drugs to the market faster. In Biopharmaceuticals, Pall filtration, chromatography, sampling, monitoring and quality assurance products, together with technical services in validation, assays and process optimization accelerate bioprocessing with respect to pilot-scale development, aseptic processing, fermentation and downstream processing.

### **PIC SOLUTION INC.**

P.O. Box 629, West Chester, PA 19381, USA  
484-319-4281

[www.pic-sfc.com](http://www.pic-sfc.com)

PIC Solution Inc., based in West Chester, PA, is a subsidiary of PIC Solution SAS of Avignon, France, the manufacturer of analytical and preparative scale supercritical fluid chromatographs. Preparative equipment ranges from the bench-top SFC-PICLab PREP 100 to the pilot scale SFC-PICLab PREP 1000. The SFC-PICLab Analytic, an analytical SFC system with automated method development capability and the SFC-PICLab Hybrid systems which combine analytical and preparative scale systems into a single instrument are also available.

### **PUROLITE**

150 Monument Road, Bala Cynwyd, Suite 202, Bala Cynwyd, PA 19004, USA  
610-668-9090

[www.purolite.com](http://www.purolite.com)

Resins for Ion Exchange, Catalysis, Adsorption and Specialty Applications. With our unique market-leading team of field experts, global manufacturing capability and record of innovative research, Purolite® offers the most extensive range of products of any resin manufacturer. Purolite brings a unique commitment to the food & beverage, pharmaceutical, sugar & sweeteners, potable water, and a host of other industries. Just Ask Purolite.

### **ROUSSELET ROBATEL KROMATON**

703 West Housatonic Street, Suite L15, Pittsfield, MA 01201, USA  
413-499-4818

[www.rousselet-robotel.com](http://www.rousselet-robotel.com)

Rousselet Robotel Kromaton manufactures centrifugal partition chromatographs for isolation and purification of natural products, biological matrices, synthetic compounds, and for biotechnology applications. Advantages of the Kromaton FCPC centrifugal chromatograph include complete sample recovery, solid phase chromatographic materials are not required, and low solvent consumption. The FCPC chromatograph can be equipped with different interchangeable rotors for analytical, semi-preparative, and preparative scales. Complete, turn-key systems are available with sample injection and recovery.

# Exhibitors

## Leaders in the Preparative and Process Chromatography Arena

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### **RUDOLPH INSTRUMENTS/SEPARLAB**

400 Morris Avenue, Suite 120, Denville, NJ 07834, USA  
973-525-9233

[www.rudolphinstruments.com](http://www.rudolphinstruments.com)

Rudolph Instruments in cooperation with Separlab ([www.separlab.eu](http://www.separlab.eu)) will exhibit Separlab Preparative Chromatography Columns and Separtrip Triplex Piston Pumps. These products are designed for a broad range of high efficiency preparative liquid chromatography applications for precise flow without high pressure pulsations. The high performance preparative liquid chromatography (HPPLC) Column designs are based on sound theoretical principles and practical experience resulting in flexible systems exploiting the potential of modern microparticulate sorbents and broad range of column variations.

### **SCIENTIFIC SYSTEMS, INC. (SSI)**

349 Science Park Road, State College, PA 16803, USA  
814-234-7311 or 800-441-4752

[www.ssihplc.com](http://www.ssihplc.com)

Scientific Systems, Inc (SSI) designs and manufactures a full line of high performance piston pumps and components for Preparative LC and Process applications. Our new HF-Series Pump delivers flow rates up to 300 ml/min and pressures up to 10,000 psi. Complete Preparative HPLC Systems are also available. Since 1967, SSI has provided innovative products to the laboratory and industrial markets, with the highest level of Quality and Customer Service.

### **SEMBA BIOSCIENCES, INC.**

505 S. Rosa Road, Madison, WI 53719, USA  
866-634-1114

[www.sembabio.com](http://www.sembabio.com)

Semba Biosciences, Inc. is a life science company located in Madison, Wisconsin, USA. Founded in 2005, Semba Biosciences manufactures and sells instruments and consumables for purification of biomolecules and chemical compounds and provides contract purification services. The company's key focus is on bench scale continuous chromatography instrumentation. Semba's Octave™ Chromatography System is a fully automated, benchtop deployable, continuous flow chromatography system for research and semi-preparative scale purification of high-value biomolecules and chemical compounds.

### **TELEDYNE ISCO**

4700 Superior Street, Lincoln, NE 68504, USA  
402-465-2076

[www.isco.com](http://www.isco.com)

Teledyne Isco designs and manufactures innovative Flash chromatography instruments and consumable media for the laboratory. Chemists use our products to purify organic compounds, including natural products, peptides, and polymers. Our innovative products are used worldwide for discovering new synthesized or natural drug candidates, improving agriculture and food quality, and researching plastics, fuels, fragrances, and more. For information call Chromatography Product Marketing Manager Ron Lewis at 402-465-2076, email [rllewis@teledyne.com](mailto:rllewis@teledyne.com), or visit [www.isco.com](http://www.isco.com).

# Exhibitors

## Leaders in the Preparative and Process Chromatography Arena

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### **WATERS CORPORATION**

34 Maple Street, Milford, MA 01757, USA  
508-478-2000

[www.waters.com](http://www.waters.com)

Waters helps laboratory-dependent organizations by providing breakthrough technologies and solutions. Pioneering a connected portfolio of separation and analytical science, laboratory informatics and mass spectrometry, Waters provides the tools to improve the quality of today's science and explore the infinite possibilities of tomorrow. Waters, The Science of What's Possible.

### **YMC AMERICA, INC.**

941 Marcon Boulevard, Suite 201, Allentown, PA 18109, USA  
610-266-8650

[www.ymcamerica.com](http://www.ymcamerica.com)

YMC America will be exhibiting new HG Series preparative reverse phase resins based on a high strength silica. Information on Triart hybrid technology in a 10 micron particle bonded with C18 and C8 chemistry as well as the BioPro family of SAX and SCX chemistry in 5, 30 and 75 micron particles for protein analysis and purification will also be available at the booth. Ask about YMC SFC tested columns in 11 selectivities!

### **ZEOCHEM**

1600 West Hill Street, Louisville, KY 40232, USA  
860-355-5212

Seestrasse 108, CH-8707 Uetikon, SWITZERLAND  
+41-1-922-9393

[www.zeochem.com](http://www.zeochem.com)

Zeochem AG manufactures high quality irregular and spherical silica gels for liquid chromatography and synthetic zeolites for dehydration, purification and catalysis on a large scale. Since more than 35 years large production batch sizes and high reproducibility for normal phase (NP) and reversed phase (RP) silica gels have made Zeochem's silica gels one of the most reliable materials for process chromatography and flash applications worldwide. Zeochem AG is headquartered in Uetikon/Switzerland (founded 1818) and member of the swiss CPH Chemie+Papier Holding AG.