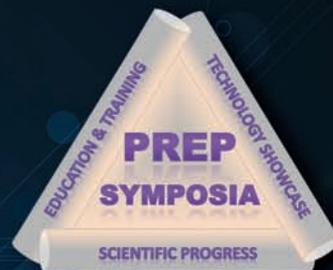


■ SYMPOSIUM CHAIR
Prof. Giorgio Carta
University of Virginia

■ SYMPOSIUM/EXHIBIT MANAGER
Ms. Janet Cunningham
Barr Enterprises
301.668.6001
janet@barrconferences.com
www.Linkedin.com/in/BarrEnterprises
www.PREPsymposium.org



FINAL PROGRAM

July 7-10, 2019 • Baltimore, MD USA
Hyatt Regency Baltimore Inner Harbor Hotel

PREP 2019

32nd International Symposium on Preparative
and Process Chromatography

WWW.PREPSYMPOSIUM.ORG



Develop robust and efficient downstream chromatography processes



Visit us at the PREP symposium

You might have years of experience in mAb downstream development and are curious about ways to improve. Or perhaps you are just getting into purification development for antibody variants or viral vectors. Either way, our support can make you go further. With solutions for efficient process development, you get the confidence to make great choices for a robust process outcome.

- High-throughput process development
- Scale-up and scale-down studies
- Process characterization
- Intensified downstream processing

Presentations

- Development of a novel fiber-based chromatography platform to break downstream bottlenecks
- A scalable adenovirus production process, from cell culture to purified bulk
- Alkaline effect on evolutioneered protein A affinity ligands
- Effective sporicidal sanitization of chromatography columns
- Quality by design (QbD): Light on a chromatography blind spot

Workshop

Monday, July 8, 12 to 1:30 PM

Drivers and visions for process development and purification technology for antibody variants, viral vectors and oligos

[Sign up at GE's booth to reserve your spot](#)



gelifesciences.com/Process-Development

GE and the GE Monogram are trademarks of General Electric Company.
© 2019 General Electric Company
GE Healthcare Bio-Sciences AB, Björkgatan 30, 751 84 Uppsala, Sweden.
For local office contact information, visit gelifesciences.com/contact
KA7540100519AD

.....

Chromatography resins

Developed with you in mind

.....



Purolite Life Sciences continues to lead the future of chromatography with the expertly-designed Praesto® & Chromalite® range of agarose and synthetic resins.

The ideal choices for high resolution, intermediate or capture chromatography.



From lab to process scale applications



Over 35 years of experience



Global manufacturing capabilities



Customizable products



Patented technology for increased performance

Your trusted partners for resin technology solutions

Learn more
purolitelifesciences.com

Talk to us
lifesciences@purolite.com



Purolite®
Life Sciences

Kromasil®



Kromasil anniversary
30 years of chromatography

Beyond expectations

30 years has gone since Kromasil was first introduced to the market and changed the performance expectations on preparative HPLC packing materials.

Today, Kromasil is offering a full-range product line for analysis and production by UHPLC/HPLC and SFC, and stands ready to support your future separations.

We are Nouryon

AkzoNobel Specialty Chemicals is now Nouryon, your partner in essential chemistry for a sustainable future.

www.kromasil.com

PREP 2019
Visit us at
booth #13

Nouryon

A person is climbing a rock wall. The wall is divided diagonally into a white lower half and a green upper half. The green section is decorated with various colorful biomolecule models, including purple and green spiky structures, blue and green leaf-like structures, and orange and green structures. The white section has several grey and black rock holds. The person is wearing a white tank top and black leggings, and is reaching up to grab a hold on the green section.

NO BIOMOLECULE TOO CHALLENGING

Conquer purification with Nuvia aPrime 4A Resin

Biomolecules are becoming more complex and benefit from novel mixed-mode technologies. Nuvia aPrime 4A is a new hydrophobic AEX resin engineered with distinctly balanced modes for better interactions with your target. A wider design space allows you to overcome downstream bottlenecks, delivering high purities and yields. Triumph with even the most challenging biomolecules.

Learn more and sample today at [bio-rad.com/PREP19](https://www.bio-rad.com/PREP19)

BIO-RAD

REGISTER TO ATTEND OUR LUNCH SEMINAR AT BOOTH 12 ON MONDAY, JULY 8

bioproduction

thermo
scientific

applied
biosystems

gibco

Bioprocessing by Design

Driving performance through collaboration

Biologics are complex and every process is unique. That's why you want a partner who can respond to your needs—even if what you need is a custom or open architecture approach. With a proven portfolio of solutions that spans from discovery through large-scale commercial production, our specialists have the know-how to adapt to what's next. It's our commitment to you, and **it's what we call Bioprocessing by Design.**

Let's move forward together.

Find out more at [thermofisher.com/bioprocessing](https://www.thermofisher.com/bioprocessing)

ThermoFisher
SCIENTIFIC

For Research Use or Further Manufacturing. Not for diagnostic use or direct administration into humans or animals.

© 2018 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. COL07702 0918

WWW.PREPSYMPIOSIUM.ORG • July 7-10, 2019 • Baltimore, MD USA

PREP 2019

32nd International Symposium on Preparative and Process Chromatography

—PREP 2019 Final Scientific Program—

PREP 2019 Chair

Giorgio Carta, University of Virginia

Organizing Committee

Lois Ann Beaver, LAB Enterprises
Giorgio Carta, University of Virginia (Chair)

Olivier Dapremont, AMPAC Fine Chemicals
Chen Wang, AbbVie
Qi (Tony) Yan, Pfizer

Scientific Advisory Committee

Dorota Antos, Rzeszow Univ. of Tech., Poland
Steven Cramer, Rensselaer Polytechnic Institute
Ranga Godavarti, Pfizer
Kent Goklen, GlaxoSmithKline
Alois Jungbauer, BOKU, Vienna, Austria
Abraham Lenhoff, University of Delaware
Massimo Morbidelli, ETH Zurich, Switzerland
Igor Quinones-Garcia, Mersana Therapeutics

David Robbins, AstraZeneca
David Roush, Merck & Co., Inc.
Melody Schmidt, Genentech
Andreas Seidel-Morgenstern, Max-Planck Institute,
Magdeburg, Germany
Owen Thomas, University of Birmingham, UK
Shuichi Yamamoto, Yamaguchi University, Japan

Industrial Advisory Committee

Geoffrey Cox, Chromatography Consultant
Fred Ghanem, Purolite Life Sciences
Marc Jacob, Phenomenex
Jiali Liao, Bio-Rad Laboratories
Ceclia Mazza, Nouryon/Kromasil

Kathleen Muhlbachler, YMC Process
Technologies
Laszlo Frici Nemeth, RotaChrom
Tetsuyuki Saika, DAISO Fine Chem USA, Inc.
Ernie Sobkow, Consultant

Poster Session Chairs

Melody Schmidt, Genentech, and Owen Thomas, University of Birmingham

Symposium / Exhibit Manager

Ms. Janet Cunningham, Barr Enterprises
Phone 301-668-6001
janet@barrconferences.com
LinkedIn.com/in/BarrEnterprises
PREPsymposium.org

All devices must be silenced and screens darkened in oral sessions. No photography or recording is allowed in oral sessions or in the poster/exhibit hall. You must wear your official conference name badge (no badge sharing), and your name and name badge must be completely visible at all times, in order to enter, and while you are inside, the meeting rooms and poster/exhibition hall. Persons without a visible name badge, or with a badge that is not their own name badge, will be escorted out of the meeting room or exhibition hall. Material presented or displayed during the conference, including but not limited to orals, posters, workshops, and exhibit booths, is the intellectual property of the presenter and may not be recorded, photographed, quoted, disseminated or transmitted by summary in any form without express written authority of the author. Opinions expressed by presenters, instructors and exhibitors are not necessarily the opinions of the PREP 2019 Symposium.

Message from the PREP 2019 Chair

On behalf of the Organizing Committee, I welcome you again for the second year in a row to Baltimore, Maryland, for **PREP 2019, the 32nd International Symposium, Exhibit & Workshops on Preparative and Process Chromatography**. PREP 2019 continues its three-decade history of driving scientific progress by bringing together the very best people and companies in the field with an exciting scientific program, with in-depth technical education and training opportunities, and with a vibrant exhibit and vendor workshops showcasing the latest commercial technology.

The Scientific Program includes 71 oral presentations and 102 posters addressing the most recent developments in preparative chromatography from the gram scale to the multiple ton scale for both small molecules and for biomolecules. The **Oral Program** includes **Keynote Sessions** on Industrial Case Studies in Protein Chromatography (#1), Preparative Chromatography in Drug Discovery, Development, and Manufacture (#5); Continuous Chromatography (#6), and Separation of Peptides and Oligonucleotides (#9); **Plenary Sessions** on Innovative Stationary Phases and Processes (#2), Fundamentals Applied to Understand Chromatography Columns (#10), Monoliths and Membrane Chromatography (#11), and Purification of Virus, VLP, and Plasmids (#12); and **Parallel Sessions** on Process Modeling (#3A and #4A), Stationary Phases (3B, 4B, and 7B), QbD in Biopharmaceutical Process Development and Manufacturing (#7A), Alternative Chromatographic Processes (#8A), and Continuous Processes (#8B). The **Poster Program** consists of two poster sessions on Monday and Tuesday will all posters on display both days. Best posters will be selected by the poster session co-chairs and judging committee. I encourage you to attend the poster sessions that provide an excellent opportunity for in-depth discussion with the authors.

The **Technical Education Program** includes two half-day **Sunday Workshops** addressing "Fundamentals of Preparative Chromatography for Biomolecule Purification by Batch and Continuous Processes" and "Fundamentals of Preparative Chromatography for Purification of Small and Intermediate Size APIs by Batch Chromatography, SMB, and SFC" as well as Monday and Tuesday morning **Tutorials** on "Tips, Tricks, and Troubleshooting Analytical and Overloaded Prep Chromatography" and on "Practical Concepts on Process Characterization and Validation of Biopharmaceuticals based on QbD Principles". The **Vendor Exhibit** includes 25 exhibitors who bring to you the latest commercial advances. Nine **Vendor Workshops** sponsored by Agilent Technologies, Bio-Rad Laboratories, DAISO Fine Chem USA, Inc., GE Healthcare Life Sciences, Knauer, Nouryon/Kromasil, Novasep, PuroLite Life Sciences, and Thermo Fisher Scientific complement the exhibit with more extensive and detailed information on new materials, equipment, and processes. These workshops are free and include light meals, but you must register in advance by visiting the vendor booth. 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.

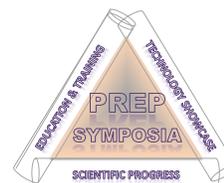
I wish to thank the many people who have helped make PREP 2019 possible. Firstly, I want to thank our **Corporate Sponsors** Ampac Fine Chemicals, AstraZeneca, Bristol-Myers Squibb, Genentech, GlaxoSmithKline, Merck & Co., Inc., Pfizer, and RotaChrom; our **Gold Sponsors** GE Healthcare and PuroLite Life Sciences; our **Silver Sponsor** Nouryon/Kromasil; and our **Bronze Sponsors** Bio-Rad Laboratories, Thermo Fisher Scientific and YMC America. Secondly, I want to thank the members of the **Scientific Advisory Committee** and of the **Industrial Advisory Committee** as well as all of the **Session Chairs** for their help in planning and promoting the Symposium, reviewing the abstracts, and invaluable help in developing the technical program. Thirdly, I want to thank the Exhibitors for bringing their latest products and technologies to the exhibit and workshops, and all of the people who have submitted so many excellent abstracts. Fourthly, I want to thank our **Symposium/Exhibit Manager** Ms. Janet Cunningham of Barr Enterprises and her staff for their organizational efforts as well as several student aides who have volunteered to ensure a smooth running of the symposium. Finally, I want to thank you for attending PREP 2019.

We have, of course, been thinking already about future PREP Symposia. The Organizers would absolutely welcome your comments and suggestions. While you attend PREP 2019, please take note of what you see that could be improved, what new topics could be brought to the meeting, and what new formats might provide more effective exchanges of scientific ideas and awareness of new technologies and then let us. Your feedback and ideas would be highly appreciated.

In the meanwhile, I very much hope you will enjoy this meeting and that the talks, posters, exhibits, training and vendor workshops, discussions, and networking opportunities will help you solve today's separation problems and better prepare you for the future of preparative chromatography.



Giorgio Carta
University of Virginia
PREP 2019 Chair



Thank you to our PREP 2019 Sponsors

Corporate Sponsors



Gold Sponsors



Silver Sponsor



Bronze Sponsors



Thank you to our PREP 2019 Media Partners



At-a-glance List of Sponsors, Exhibitors, Media Partners

Agilent Technologies	LabBulletin
AMPAC Fine Chemicals (corporate sponsor)	LABOMATIC Instruments AG
Analytical Scientist	LCGC
Asahi Kasei Bioprocess America Inc.	Merck & Co., Inc. (corporate sponsor)
AstraZeneca (corporate sponsor)	Nouryon/Kromasil (Silver sponsor)
Avitide	Novasep
BioProcessing Journal	Pfizer (corporate sponsor)
Bio-Rad Laboratories (Bronze sponsor)	Postnova Analytics
Bio-Works	Purolite Life Sciences (Gold sponsor)
Bristol-Myers Squibb (corporate sponsor)	Repligen
Chromatography Today	RotaChrom (corporate sponsor)
DAISO Fine Chem US	Separation Science
emp Biotech LLC	Sepax Technologies
Essential Life Solutions	Sepiatec
GE Healthcare Life Sciences (Gold sponsor)	Servier CDMO
Genentech (corporate sponsor)	Shimadzu Scientific Instruments
Genetic Engineering and Biotech. News	SP Scientific
GlaxoSmithKline (corporate sponsor)	Suzhou Nanomicro Technologies
International Labmate	Thermo Fisher Scientific (Bronze sponsor)
JSR Life Sciences	Wyatt Technology
Kaneka	YMC America (Bronze sponsor)
KNAUER	

Workshop 1: Sunday, July 7, at 9:00 AM - 1:00 PM
Fundamentals of Preparative Chromatography for
Biomolecule Purification
by Batch and Continuous Chromatography

*Workshop registration is in addition to the symposium registration fee;
open to conference and non-conference participants.
Location: Maryland Suite "ANNAPOLIS", 2nd floor
Must pre-register/pay to attend at PREPsymposium.org*

Focus: Biomolecule chromatography, stationary phases, binding capacity and selectivity, mass transfer, modeling, design for capture and resolution, multicolumn and continuous chromatography processes.

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 resolution applications will be discussed including multicolumn and continuous bio-chromatography processes.

Topics: Adsorption equilibrium and transport in single and multicomponent systems; Stationary phases for small and large biomolecules; Design and optimization of batch processes for capture and high-resolution steps; Multicolumn and continuous bio-chromatography processes; Process validation.

Expert Instructors:

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.

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.

Massimo Morbidelli received his Laurea in Chemical Engineering at the Politecnico di Milano in 1977, and his Ph.D. in Chemical Engineering at the University of Notre Dame in 1986. After appointments as professor at the University of Cagliari (Italy) and at the Politecnico di Milano, since 1997 he is Professor of Chemical Reaction Engineering at the Institute for Chemical and Bioengineering at ETH Zurich (Switzerland). His research interests are in polymer reactions and reaction-separation processes based on continuous chromatography and in biomolecule purification with specific focus on therapeutic proteins and monoclonal antibodies. He is co-author of more than 300 papers, 11 international patents and 4 books. He serves as an associate editor of *Industrial & Engineering Chemistry Research*, and is a member of the scientific board of several international journals. He is the recipient of the 2005 R.H. Wilhelm Award in Chemical Reaction Engineering of the American Institute of Chemical Engineers.

Workshop 2: Sunday, July 7, at 2:00 - 6:00 PM
Fundamentals of Preparative Chromatography for
Purification of Small and Intermediate Size APIs by
Batch Chromatography, SMB, and SFC

*Workshop registration is in addition to the symposium registration fee;
open to conference and non-conference participants.*

*Location: Maryland Suite "ANNAPOLIS", 2nd floor
Must pre-register/pay to attend at PREPsymposium.org*

Focus: Small molecules, APIs, peptides, oligonucleotides, chiral molecules, HPLC, column packing, gradient elution, overloaded chromatography, SFC, SMB, examples and industrial applications.

This workshop will focus on development of methods 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.

Expert Instructors:

Olivier Dapremont received his Ph.D. on Chemical Engineering and Applied Chemistry from University of Paris on the development of continuous chromatography for the pharmaceutical industry. He has worked on the development of SMB technology since 1992. He is currently Executive 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. He is coauthor of several publications and patents related to the use of SMB applications for the purification of small molecules.

Geoffrey Cox received his Ph.D. in Organic Chemistry from the University of Sheffield, England. Since then his career has been centered around chromatography, starting with preparative gas chromatography through introduction of HPLC to the premier Government analytical laboratory in the UK, development of bonded stationary phases and moving to preparative and industrial scale chromatography first with Du Pont and then in the mid-1980s as Director R&D with Prochrom. In 1997 he moved to Chiral Technologies, first in Europe before relocating to the USA as VP Technology, working in chiral separations. In March 2011 he started the US subsidiary of PIC Solution, the French SFC manufacturer, in order to expand the company's business into North America. He is author and coauthor of several publications and patents related to the use of chromatography for the purification of small molecules using multiple techniques.

Tutorial: Monday, July 8, at 7:00 - 8:25 AM
Tips, Tricks, and Troubleshooting
Analytical and Overloaded Prep Chromatography

*Tutorial registration is in addition to the symposium registration fee;
open to conference and non-conference participants.
Location: Maryland Suite "ANNAPOLIS", 2nd floor
Must pre-register/pay to attend at PREPsymposium.org*

Focus: Analytical chromatography, overloaded chromatography, HPLC, SFC, examples of small molecules, APIs, peptides

This workshop will focus on the practical aspects of analytical and preparative chromatography, scale-up, and how to overcome the challenges that the chromatographer encounters on a daily basis by using the tips and tricks provided.

Topics: Analytical and Preparative chromatography purpose, practical scaleup, issues with peak shape, considering the whole chromatographic system (equipment, column and software) as contributors to the final chromatographic result, troubleshooting tools for improved chromatographic performance.

Expert Lecturers:

Cecilia Mazza has worked with small molecules, APIs, peptides and proteins for twenty-five years, both in analytical as well as preparative chromatography. She is product manager and regional sales manager for Kromasil columns and bulk at AkzoNobel in Sweden, now Nouryon.

Qi (Tony) Yan is currently working for Pfizer, Inc. (Groton, CT, USA) in the field of impurity isolation for structure elucidation in the department of pharmaceutical science. He has worked in pharmaceutical research and development in the area of chiral and achiral purifications, and impurity isolation for over 20 years.

Tutorial: Tuesday, July 8, at 7:00 - 8:25 AM
Practical Concepts on Process Characterization and Validation of
Biopharmaceuticals based on QbD Principles

*Tutorial registration is in addition to the symposium registration fee;
open to conference and non-conference participants.
Location: Maryland Suite "ANNAPOLIS", 2nd floor
Must pre-register/pay to attend at PREPsymposium.org*

Focus: This workshop will focus on the practical aspects of analytical and preparative chromatography, scale-up, and how to overcome the challenges that the chromatographer encounters on a daily basis by using the tips and tricks provided.

Topics: This interactive tutorial introduces principles of Quality by Design including preparation of risk assessments, design of experiments for process characterization, statistical data analysis, quality risk management and validation of biopharmaceutical processes. Topics: Quality by Design, quality risk management, overall process control strategy, process characterization, application examples.

Expert Lecturer:

Gisela Ferreira received her Ph.D. in Chemical Engineering from the University of Maryland Baltimore County in 2001 and is currently Senior Scientist in the Process Biochemistry Group at AstraZeneca. Prior to joining AstraZeneca she held positions as Senior Scientist at Medarex in the downstream department. Dr. Ferreira has broad biotechnology experience and expertise in areas including process development for large-scale cGMP manufacture of biologics, recombinant biopharmaceutical purification (early and late stage development), QbD, technology transfer and scale-up.

Monday Free Vendor Technical Workshops

July 8, 2019 at 12:30 – 2:00 PM

Must pre-register at the sponsor's booth to attend; light meal will be provided

- 12:30-2:00 pm **Drivers and Visions for Process Development and Purification Technology for Antibody Variants, Viral Vectors and Oligos**
Maryland Suite “ANNAPOLIS” Sponsored by GE Healthcare Life Sciences
2nd floor Must pre-register at the booth of GE Healthcare Life Sciences by Monday @ 10:50 AM
Presenter: Peter Hagwall and John Scibetta. The changing biopharma pipeline is creating challenges to process development and manufacturing methodology. Bispecific antibodies, conjugated antibodies and other antibody variants as well as viral vectors and oligonucleotides contribute to this increased molecular diversity. With an ever-increasing pressure to reduce time to market, there is a need to revise how process development is performed and what technologies are employed for manufacturing. We will review the trends in process development and emerging technology for purification of these molecular formats and discuss purification strategies to address the increasing productivity demands of mAbs and purification approaches for antibody variants including bispecific antibodies.
- 12:30-2:00 pm **Overcoming mAb and Virus Purification Challenges with Innovative Resin Designs**
Maryland Suite “COLUMBIA” Sponsored by Bio-Rad Laboratories
2nd floor Must pre-register at the booth of Bio-Rad Laboratories by Monday @ 10:50 AM
Presenters: Dr. Mark A. Snyder, R&D Manager and Dr. Carsten Voss, Applications Manager of the Process Chromatography Group at Bio-Rad Laboratories. Purification of biologics can face a range of obstacles, depending on the characteristics of the molecule, which can affect product purity and recovery. Improvements of purification tools are necessary to overcome these challenges and must be engineered for easy scalability to meet manufacturing demands. In this seminar, we will discuss the difficulties that are faced when developing purification strategies for monoclonal antibodies and viruses. We will explore innovative resin designs and functionalities and examine recent case studies and current processes that benefit from these resins used from capture to polishing of biologics.
- 12:30-2:00 pm **Flexible Solutions for Continuous and Batch Purification of Small Molecules and Biomolecules**
Maryland Suite “BALTIMORE” Sponsored by KNAUER
2nd floor Must pre-register at the booth of KNAUER by Monday @ 10:50 AM
Presenter: Paul Pietsch. KNAUER presents a new generation solution enhancing the flexibility of purification. With a new device up to three different modules such as pumps, valves and detectors can be easily used. The fast exchange of modules by the user allows an easy adaption to different purification tasks and reduces the down times and service costs. Above that KNAUER's robust purification solutions offer a wide detector portfolio, e.g. mass-triggered fractionation. Smart valves allow switching tasks beyond peak and solvent recycling. And even more: Increase the purity and yield of your purification by a continuous process with AZURA SMB. KNAUER offers purification solutions for small and biomolecules. Get to know the new device/systems at our booth.
- 12:30-2:00 pm **Cost Reduction Verification Test with 50L Scale Down Stream Process**
Maryland Suite “FREDERICK” Sponsored by DAISO Fine Chem USA, Inc.
2nd floor Must pre-register at the booth of DAISO Fine Chem USA, Inc. by Monday @ 10:50 AM
Presenter: Masashi Jousha. Daisogel series new protein A media has the ability to elute antibodies at mild pH which contributes to the quality of the antibody. The exposure of the antibody to acidic conditions is reduced and as a result, the aggregate formation is suppressed. This helps improve the antibody yield and purity leading to an overall cost savings. In addition, filter consumption in the manufacturing process is also reduced, making it less likely to lose product by filter replacement. In this workshop, we show an example of purifying 50 L of culture supernatant and estimate the cost saving effect.

Tuesday Morning Free Vendor Technical Workshop

July 9, 2019 at 7:00 – 8:25 AM

Must pre-register at the sponsor's booth to attend; light meal will be provided

7:00-8:25 am **Accelerating Antibody Drug Development – Innovative Solutions for Antibody Purification**

Maryland Suite Sponsored by Thermo Fisher Scientific

“FREDERICK” Must pre-register at the booth of Thermo Fisher Scientific by Monday @ 10:50 AM

2nd floor

The changing landscape for antibody-derived therapeutics, such as bi-specific monoclonal antibodies, Fabs and Fc-fusion proteins, brings new purification challenges in the downstream process of these molecules. Standard chromatography resins, such as protein A, may not result in the most efficient process. During this seminar you will learn more about efficient purification of antibody therapeutics and how our unique portfolio of antibody affinity resins can help you develop the next generation of antibody therapeutics, including a customer case study showing an improved therapeutic antibody manufacturing process.

Tuesday Free Vendor Technical Workshops

July 9, 2019 at 12:30 – 2:00 PM

Must pre-register at the sponsor's booth to attend; light meal will be provided

12:30-2:00 pm **Manufacturing Innovation: A Complete Chromatography Resin Portfolio for Reverse-phase, Ion Exchange and Protein A Affinity Separations**

Maryland Suite Sponsored by Purolite Life Sciences

“COLUMBIA” Must pre-register at the booth of Purolite Life Sciences by Tuesday @ 10:40 AM

2nd floor

Presenters: Hans J. Johansson and Alessandra Basso. Hans J. Johansson will give an update on recent developments of the Praesto range of agarose-based chromatography resins. The presentation will cover Protein A, high salt tolerant IEX resins, and the jetting technology for continuous manufacturing of resins with a very narrow particle distribution. Alessandra Basso will present the Chromalite M methacrylate-based resins with a full range of functionalities, including ion exchange, reverse-phase and, affinity chromatography. Available in standard average particle sizes of 50 -100 µm and 75-200 µm, for high resolution, intermediate purification, or capture chromatography; Purolite Life Sciences can also offer customization of Chromalite M from 5 to 500 µm for any application.

12:30-2:00 pm **New Developments in the Purification of Biotherapeutics**

Maryland Suite Sponsored by Nouryon/Kromasil

“FREDERICK” Must pre-register at the booth of Nouryon/Kromasil by Tuesday @ 10:40 AM

2nd floor

Presenter: Cecilia Mazza. Peptides and oligonucleotides have an increased interest due their therapeutics potential and chromatographers must deal with an ever-increasing variety of structures in the purification of key APIs. Kromasil, high performance chromatographic media based on state-of-the-art spherical silica for UHPLC/HPLC/SFC analysis and purification using HPLC, SFC and SMB process technology, has a unique combination of pore volume and surface area, plus very high mechanical and chemical stability, making it ideal for the separation of substances from small to large biotherapeutics. During this workshop, we will share the latest solutions for the purification of complex biotherapeutic mixtures, including method development and optimization for maximizing purity, yield and productivity.

Tuesday Free Vendor Technical Workshops (continued)
July 9, 2019 at 12:30 – 2:00 PM
Must pre-register at the sponsor's booth to attend; light meal will be provided

12:30-2:00 pm **A Unified Open-Access Amenable Workflow from Analysis to Purification**
Maryland Suite Sponsored by Agilent Technologies
"ANNAPOLIS" Must pre-register at the booth of Agilent Technologies by Tuesday @ 10:40 AM
2nd floor Presenter: Paul Zimba, Center for Coastal Studies, Texas A&M University-Corpus Christi.
Currently cyanobacteria, diatoms, haptophytes, dinoflagellates, euglenoids, and raphidophytes are known to produce algal toxins. Bioactivity of these toxins include neurotoxicity, cytotoxicity, hepatotoxicity, and a significant number with unknown targets. Preparation of these toxin standards largely relies on purification from algal cells. In this workshop we present the workflow of euglenophycin, from analysis to purification, to determine the presence of compounds, as well as purify these compounds in an open access and automated manner. This workflow allows researchers to determine the presence of targeted compounds through an analytical run, then the system automatically scales the solvent gradient to purify the selected compounds using the preparative purification system, which can be triggered on time, UV absorption and/or MS signal of target peak.

12:30-2:00 pm **Industrial Purification Solutions with Innovative Process Technology**
Maryland Suite Sponsored by Novasep
"BALTIMORE" Must pre-register at the booth of Novasep by Tuesday @ 10:40 AM
2nd floor Presenter: Jin Seok Hur. In the workshop, we will present innovative chromatography processes such as Cyclojet® and GSSR® (Gradient Steady State Recycle), which are designed to resolve challenging purifications with outstanding productivity. The cutting-edge technologies have been proven at development scale and are already used for large scale API manufacturing at Novasep. Novasep provides flexible development and manufacturing solutions for APIs to innovators at a wide range of production scales. We offer specialized technologies, process development expertise and an outstanding regulatory track record. Novasep is a leading manufacture and operator of industrial chromatography equipment, with over 30 years of commercial manufacturing experience.

Key to Lecture and Poster Numbers

<u>First Symbol</u>	P = Poster Presentation L = Lecture Presentation	<u>P</u> -M-200 <u>L</u> -100
<u>Second Symbol</u>	Day to present poster M = Monday T = Tuesday	P- <u>T</u> -200
<u>Last Symbol</u>	Poster Presentation Number Lecture Presentation Number	P-M- <u>100</u> L- <u>200</u>

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 presented to the best poster contributions in the two separate categories of (a) academic and non-profit research institutions and (b) industry. In the case of joint academia/industry posters, the affiliation of the poster presenter will determine the category. 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 Symposium Manager before 11:00 a.m. on Tuesday, July 9.

Presentation of awards to winners of the Best Poster Competition will take place at the end of the session immediately prior to the Wednesday mid-morning break. The winners are encouraged to be present, but it is not mandatory to be present to win.

Sunday, July 7, 2019

- 9:00 AM - 1:00 PM
Maryland Suite
"ANNAPOLIS"
2nd floor
- Workshop 1 on Fundamentals of Preparative Chromatography for Biomolecule Purification by Batch and Continuous Processes**
See details and pricing at PREPsymposium.org. Open to conference and non-conference participants. Must pre-register to attend.
- 2:00 PM - 6:00 PM
Maryland Suite
"ANNAPOLIS"
2nd floor
- Workshop 2 on Fundamentals of Preparative Chromatography for Purification of Small and Intermediate Size APIs by Batch Chromatography, SMB, and SFC**
See details and pricing at PREPsymposium.org. Open to conference and non-conference participants. Must pre-register to attend.
- 1:30 PM - 5:30 PM
- Exhibitor Registration Only -- badge required to set up booth**
Location: Constellation Ballroom, 2nd floor
- 6:00 PM - 7:30 PM
- Symposium Registration Open for Conferees**
Location: Constellation Ballroom, 2nd floor
- 6:00 PM - 7:30 PM
- Grand Opening of the Exhibition & Welcome Reception**
Location: Constellation Ballroom, 2nd floor
Open to all conference participants; conference name badge is required for entry.

Monday, July 8, 2019

Monday Tutorial

- 7:00 AM - 8:25 AM
Maryland Suite
"ANNAPOLIS"
2nd floor
- Tutorial on Tips, Tricks, and Troubleshooting Analytical and Overloaded Prep Chromatography**
See details and pricing at PREPsymposium.org. Open to conference and non-conference participants. Must pre-register to attend.
- 7:30 AM
- Symposium Registration Open**
Location: Constellation Ballroom, 2nd floor
- 10:00 AM - 7:10 PM
- Exhibition Open**
Location: Constellation Ballroom, 2nd floor

Monday, July 8, 2019

Monday Welcome and Opening Remarks

Location: Constellation Ballroom C/D, 2nd floor

8:30 AM - 8:40 AM

WELCOME AND OPENING REMARKS

Giorgio Carta, University of Virginia, Charlottesville, VA, USA

1. Monday Keynote Session: Industrial Case Studies in Protein Chromatography

Session Chairs: Alan Hunter and Timothy Pabst, AstraZeneca

Location: Constellation Ballroom C/D, 2nd floor

8:40 AM

(L-101) **Applying Quality by Design Principles for Accelerated Process Characterization and Biologics Development.** Hong Li¹, Gaurav Chauhan¹, Sunitha Kandula¹, David Wylie¹, Seth Clark², Gregg Nyberg¹, ¹Merck & Co. Inc., Kenilworth, NJ, USA; ²Merck & Co. Inc., West Point, PA, USA

9:00 AM

(L-102) **Development of ADC Purification Tool Box to Address Manufacturing Challenges.** Lihua Yang, AbbVie, Worcester, MA, USA

9:20 AM

(L-103) **A Case Study of Mechanistic Chromatography Model Applications in a Lean Development Paradigm.** Connor Thompson, Rachel Hendricks, Mark Fedesco, Jessica Yang, Genentech Inc., South San Francisco, CA, USA

9:40 AM

(L-104) **Decoupling Secondary Adsorption Mechanisms in Apparent Protein Uptake on Protein A Resins for Rational Capture Design.** Ronald Maurer, Jie Chen, Sanchayita Ghose, Zhengjian Li, Bristol-Myers Squibb, Devens, MA, USA

10:00 AM

(L-105) **Process Optimization and Protein Engineering Mitigated Manufacturing Challenges of a Monoclonal Antibody with Liquid-liquid Phase Separation Issue.** Haibin Luo, Qun Du, Melissa Damschroder, Timothy Pabst, Alan Hunter, William Wang, MedImmune, Gaithersburg, MD, USA

10:20 AM - 10:50 AM

Mixer in Constellation Exhibition Hall, 2nd floor

2. Monday Session: Innovative Stationary Phases and Processes

Session Chair: Lois Ann Beaver, LAB Enterprises

Location: Constellation Ballroom C/D, 2nd floor

10:50 AM

(L-106) **Application of Stimuli-Responsive Polymers for the Downstream Recovery of Proteins.** Sinuo Tan, Roshanak Sepehrifar, Pankaj Maharjan, Yuanzhong Yang, Roy Jackson, Lachlan Schwarz, Eva Campi, Reinhard Boysen, Kei Saito, Milton Hearn, Monash University, Clayton, AUSTRALIA

11:10 AM

(L-107) **Peptide-based Adsorbents for Improved Clearance of CHO Host Cell Proteins in Flow-through Mode.** Ashton Lavoie¹, Alice DiFazio¹, Kevin Blackburn², David Muddiman¹, Michael Goshe¹, Ruben Carbonell¹, Stefano Menegatti¹, ¹North Carolina State University, Raleigh, NC, USA; ²Waters Corporation, Raleigh, NC, USA

11:30 AM

(L-108) **A Mathematical Framework for Quantifying Product-Agnostic Orthogonality in Preparative Chromatography: Selecting and Designing Optimally Orthogonal Resins.** Nicholas Vecchiarello, Camille Bilodeau, Scott Altern, Steven Cramer, Rensselaer Polytechnic Institute, Troy, NY, USA

Monday, July 8, 2019

- 11:50 AM (L-109) **Did You Know that Magnetic Separation for Proteins Does Not have to be Expensive?** Sonja Berensmeier, Silvia Blank-Shim, Sebastian Schwaminger, Alexander Zanker, Fraga-García Paula, Technical University of Munich, Garching, GERMANY
- 12:10 PM (L-110) **3D Printed Monoliths with Quaternary Amine Functionality for Protein Separations.** Ursula Simon, Simone Dimartino, University of Edinburgh, Edinburgh, UK

Monday Mixer in the Constellation Exhibition Hall

Location: Constellation Ballroom, 2nd floor – Mixer includes light lunch in the hall

12:30 PM - 3:20 PM **Break, Exhibits, Mixer, Posters**

Monday Free Vendor Technical Workshops

Must pre-register at the sponsor's booth to attend; light lunch will be provided

- 12:30-2:00 pm **Drivers and Visions for Process Development and Purification Technology for Antibody Variants, Viral Vectors and Oligos**
Maryland Suite Sponsored by GE Healthcare Life Sciences
"ANNAPOLIS" 2nd floor *Must pre-register at the booth of GE Healthcare Life Sciences by Monday @ 10:50 AM*
- 12:30-2:00 pm **Overcoming mAb and Virus Purification Challenges with Innovative Resin Designs**
Maryland Suite Sponsored by Bio-Rad Laboratories
"COLUMBIA" 2nd floor *Must pre-register at the booth of Bio-Rad Laboratories by Monday @ 10:50 AM*
- 12:30-2:00 pm **Flexible Solutions for Continuous and Batch Purification of Small Molecules and Biomolecules**
Maryland Suite Sponsored by KNAUER
"BALTIMORE" 2nd floor *Must pre-register at the booth of KNAUER by Monday @ 10:50 AM*
- 12:30-2:00 pm **Cost Reduction Verification Test with 50L Scale Down Stream Process**
Maryland Suite Sponsored by DAISO Fine Chem USA, Inc.
"FREDERICK" 2nd floor *Must pre-register at the booth of DAISO Fine Chem USA, Inc. by Monday @ 10:50 AM*

MONDAY POSTER SESSION 1

Poster Session Chairs: Melody Schmidt, Genentech and Owen Thomas, University of Birmingham
Location: Constellation Ballroom C/D, 2nd floor

2:00 PM - 3:20 PM **POSTER SESSION 1 - Sponsored by Bristol-Myers Squibb**

Monday, July 8, 2019

3A. Monday Parallel Session: Process Modeling - I

Session Chair: Abraham Lenhoff, University of Delaware

Location: Constellation Ballroom C, 2nd floor

- 3:20 PM (L-111) **Modeling of Ion Exchange Chromatography: From Mechanistic to Empirical and Back.** Till Briskot¹, Tobias Hahn¹, Thiemo Huuk¹, Jürgen Hubbuch², ¹GoSilico GmbH, Karlsruhe, GERMANY; ²Karlsruhe Institute of Technology (KIT), Karlsruhe, GERMANY
- 3:40 PM (L-112) **Modeling of Monoclonal Antibody Charge Variant Elution in Mixed-mode Cation Exchange Chromatography.** Jan Hedrich¹, Felix Seelinger¹, Romas Skudas², Michael M. Schulte², Christian Frech¹, ¹University of Applied Sciences, Mannheim, GERMANY; ²Merck KGaA, Darmstadt, GERMANY
- 4:00 PM (L-113) **Accelerated Process Design and Simulation of Linear Gradient Elution of Proteins by using Mechanistic Modeling.** Chyii-Shin Chen, Noriko Yoshimoto, Shuichi Yamamoto, Yamaguchi University, Ube, JAPAN
- 4:20 PM (L-114) **Mechanistic Modeling of Chromatography for On-demand Production of Biologics.** Sevda Deldari¹, Shayan Borhani¹, Payam Rezaei², Yang Liu², Abhay Andar¹, Govind Rao¹, Douglas Frey², ¹University of Maryland Baltimore County CAST, Baltimore, MD, USA; ²University of Maryland Baltimore County, Baltimore, MD, USA
- 4:40 PM - 5:10 PM **Mixer in Constellation Exhibition Hall, 2nd floor**

3B. Monday Parallel Session: Stationary Phases - I

Session Chair: Rainer Hahn, BOKU, Vienna

Location: Constellation Ballroom D, 2nd floor

- 3:20 PM (L-115) **Exploring Enhanced Selectivity on Ion Exchange Resin in ADC Polishing.** Annika Holzgreve, Michael Schulte, Romas Skudas, Merck KGaA, Darmstadt, GERMANY
- 3:40 PM (L-116) **Mixed PEL Brush Modified Porous Chromatography Media for pH Modulated Protein Separations.** Thantawat Theeranan, Owen R.T. Thomas, University of Birmingham, Birmingham, UK
- 4:00 PM (L-117) **Chromalite M: A Novel Range of Methacrylic Polymers with High Performance in Chromatographic Bio-Separations.** Benjamin Summers, Alessandra Basso, Simona Serban, Purolite Ltd., Llantrisant, UK
- 4:20 PM (L-118) **Strategies for Process Design: Unlocking Combinations with Continuous Chromatography and Cutting-edge Technologies.** Ben Kester, Joseph Pate, Kate Blando, Catalent, Bloomington, IN, USA
- 4:40 PM - 5:10 PM **Mixer in Constellation Exhibition Hall, 2nd floor**

Monday, July 8, 2019

4A. Monday Parallel Session: Process Modeling - II

Session Chair: Dorota Antos, Rzeszow University of Technology

Location: Constellation Ballroom C, 2nd floor

- 5:10 PM (L-119) **Prediction of Protein Mixture Elution on Anion Exchangers.**
Catherine Mueschen, Ronald Jaepel, Johannes Buyel, Fraunhofer IME, Aachen, GERMANY
- 5:30 PM (L-120) **Error Modeling in Chromatography and Parameter Confidence.**
William Heymann, Eric von Lieres, Forschungszentrum Jülich, Jülich, GERMANY
- 5:50 PM (L-121) **Down the Drain: Troubleshooting At-scale Affinity Chromatography.**
William Rayfield¹, Ehsan Borujeni¹, Sandra Rios¹, Edward Glowacki¹, Jiong Yang², Mark Haverick¹, Tim St. Clair¹, Jesse Minor¹, ¹Merck, Kenilworth, NJ, USA; ²Merck, Rahway, NJ, USA
- 6:10 PM - 7:10 PM **Reception in Constellation Exhibition Hall, 2nd floor**

4B. Monday Parallel Session: Stationary Phases - II

Session Chair: Alois Jungbauer, BOKU, Vienna

Location: Constellation Ballroom D, 2nd floor

- 5:10 PM (L-122) **Protein A Chromatography: Important Features in Process Optimization and Benefits of Additives for mAb Elution.** Jukka Kervinen, William Evans, J. Kevin O'Donnell, Atis Chakrabarti, Phu Duong, Ali Soleymannezhad, Tosoh Bioscience LLC, King of Prussia, PA, USA
- 5:30 PM (L-123) **Protein A Engineering to Enhance Performance, Alkali Stability and Bioburden Control.** Magnus Wetterhall, Mats Ander, Tomas Bjorkman, Gustav Rodrigo, GE Healthcare Lifesciences, Uppsala, SWEDEN
- 5:50 PM (L-124) **Sweet, Sweeter - Stevia – From Analytical Method Development to a Robust and Effective Preparative HPLC Online SPE Purification Method for Steviolglycosides.** Yannick Krauke, Juliane Böttcher, Johannes Menke, Kate Monks, KNAUER Wissenschaftliche Geräte GmbH, Berlin, GERMANY
- 6:10 PM - 7:10 PM **Reception in Constellation Exhibition Hall, 2nd floor**

Tuesday, July 9, 2019

Tuesday Tutorial

7:00 AM - 8:25 AM **Practical Concepts on Process Characterization and Validation of Biopharmaceuticals based on QbD Principles**
Maryland Suite
"ANNAPOLIS"
2nd floor
See details and pricing at PREPsymposium.org. Open to conference and non-conference participants. Must pre-register to attend.

Tuesday Free Vendor Technical Workshop

Must pre-register at the sponsor's booth to attend; light lunch will be provided

7:00-8:25 am **Accelerating Antibody Drug Development – Innovative Solutions for Antibody Purification**
Maryland Suite
"FREDERICK"
2nd floor
Sponsored by Thermo Fisher Scientific
Must pre-register at the booth of Thermo Fisher Scientific by Monday @ 10:50 AM

7:30 AM **Symposium Registration Open**

9:00 AM - 3:30 PM **Exhibition Open**

5. Tuesday Keynote Session: Preparative Chromatography in Drug Discovery, Development, and Manufacture

Session Chair: Qi (Tony) Yan, Pfizer

Location: Constellation Ballroom C/D, 2nd floor

8:30 AM (L-201) **Diluent-to-Eluent Strength Mismatch in Preparative Liquid Chromatography: Coping with Resolution Losses From in-Silico Approaches.**
Fabrice Gritti, Jason Hill, Martin Gilar, Waters Corporation, Milford, MA, USA

8:50 AM (L-202) **Using pH as a Tool for Prep Chromatography: What if it Degrades Your Compound?** J Preston, Phenomenex, Torrance, CA, USA

9:10 AM (L-203) **Exploring the Relationship of SFC Stationary Phase Chemistry to Optimize Separation Performance.** Matthew Przybyciel, ES Industries, West Berlin, NJ, USA

9:30 AM (L-204) **Preparative Separation of Phosphorothioated Antisense Oligonucleotides.**
Martin Enmark¹, Joakim Bagge¹, Jorgen Samuelsson¹, Linda Thunberg², Hanna Leek², Fredrik Lime³, Per Jageland³, Torgny Fornstedt¹, ¹Karlstad University, Karlstad, SWEDEN; ²AstraZeneca, Gothenburg, SWEDEN; ³Nouryon, Bohus, SWEDEN

9:50 AM (L-205) **Recycling Liquid Chromatographic Technology to Support Drug Discovery and Development.** Frank Riley, Tony Q. Yan, Pfizer, Groton, CT, USA

10:10 AM - 10:40 AM **Mixer in Constellation Exhibition Hall, 2nd floor**

Tuesday, July 9, 2019

6. Tuesday Keynote Session: Continuous Chromatography

Session Chair: Sunitha Kandula, Merck & Co., Inc.

Location: Constellation Ballroom C/D, 2nd floor

- 10:40 AM (L-206) **Automated End-to-end Integrated Manufacturing of an Antibody.**
Sebastian Vogg, Moritz Wolf, Fabian Feidl, Nicole Ulmer, Ruben Wälchli, Massimo Morbidelli, ETH Zürich, Zürich, SWITZERLAND
- 11:00 AM (L-207) **Virus Clearance with Continuous Multi-column Chromatography.**
Jason Forte¹, Mark Pagkaliwangan¹, Meng-Jung Chiang², Scott Lute², Denis Kole¹, Krunal Mehta³, Glen Bolton³, Mark Schofield¹, Kurt Brorson², ¹Pall, Westborough, MA, USA; ²U.S. Food and Drug Administration, Silver Spring, MD, USA; ³Amgen, Cambridge, MA, USA
- 11:20 AM (L-208) **High Productivity and High Purity Charge Variant Isolation using Continuous Chromatography.** Yuanli Song, Bristol-Myers Squibb, Devens, MA, USA
- 11:40 AM (L-209) **Peptide Purification using Two- and Three-column Simulated Countercurrent Chromatography.** Tiago Santos, Raquel Serra, Goncalo Policarpo, Joao Antunes, Jose Mota, LAQV/REQUIMTE FCT-UNL, Caparica, PORTUGAL
- 12:00 PM (L-210) **Adaptive Cycle to Cycle Control of Simulated Moving Bed Processes.**
Achim Kienle, Otto von Guericke University, Magdeburg, GERMANY

Tuesday Mixer in the Constellation Exhibition Hall

Location: Constellation Ballroom, 2nd floor – mixer includes light lunch

12:20 PM - 3:10 PM **Break, Exhibits, Mixer, Posters**

Tuesday Free Vendor Technical Workshops

Must pre-register at the sponsor's booth to attend; light lunch will be provided

- 12:30-2:00 pm **Manufacturing Innovation: A Complete Chromatography Resin Portfolio for Reverse-Phase, Ion Exchange and Protein A Affinity Separations**
Maryland Suite "COLUMBIA"
2nd floor
Sponsored by Purolite Life Sciences
Must pre-register at the booth of Purolite Life Sciences by Tuesday @ 10:40 AM
- 12:30-2:00 pm **New Developments in the Purification of Biotherapeutics**
Maryland Suite "FREDERICK"
2nd floor
Sponsored by Nouryon/Kromasil
Must pre-register at the booth of Nouryon/Kromasil by Tuesday @ 10:40 AM
- 12:30-2:00 pm **A Unified Open-Access Amenable Workflow from Analysis to Purification**
Maryland Suite "ANNAPOLIS"
2nd floor
Sponsored by Agilent Technologies
Must pre-register at the booth of Agilent Technologies by Tuesday @ 10:40 AM
- 12:30-2:00 pm **Industrial Purification Solutions with Innovative Process Technology**
Maryland Suite "BALTIMORE"
2nd floor
Sponsored by Novasep
Must pre-register at the booth of Novasep by Tuesday @ 10:40 AM

Tuesday, July 9, 2019

TUESDAY POSTER SESSION 2

Poster Session Chairs: Melody Schmidt, Genentech and Owen Thomas, University of Birmingham
Location: Constellation Ballroom C/D, 2nd floor

1:50 PM - 3:10 PM **POSTER SESSION 2 - Sponsored by Bristol-Myers Squibb**

7A. Tuesday Parallel Session: QbD in Biopharmaceutical Process Development and Manufacturing

Session Chair: Christian Frech, University of Applied Sciences, Mannheim
Location: Constellation Ballroom C, 2nd floor

- 3:10 PM (L-211) **QbD: Light on a Chromatography Blind Spot.** Gunnar Malmquist, Peter Hagwall, John Scibetta, GE Healthcare, Uppsala, SWEDEN
- 3:30 PM (L-212) **Real-time Monitoring and Model-based Prediction of Purity and Quantity in a Chromatographic Step of a Biopharmaceutical.** Dominik Georg Sauer¹, Michael Melcher², Theresa Scharl-Hirsch¹, Friedrich Leisch², Alois Jungbauer², Astrid Dürauer², ¹ACIB, Vienna, AUSTRIA; ²BOKU, Vienna, AUSTRIA
- 3:50 PM (L-213) **Application of Multi-attribute Monitoring and In-silico Methodology to Address Challenges during Process Development of mAb Intermediate for ADC Programme.** Tingting Cui¹, Matthew Edgeworth¹, Samuel Shepherd¹, Lu Shan², Alistair Hines¹, Nicholas Bond¹, Richard Turner¹, ¹AstraZeneca, Cambridge, UK; ²AstraZeneca, Gaithersburg, MD, USA
- 4:10 PM (L-214) **Utilizing Mechanistic Modeling for Critical Process Parameter Identification.** Rachel Hendricks, Jessica Yang, Connor Thompson, Mark Fedesco, Genentech, South San Francisco, CA, USA
- 4:30 PM (L-215) **Evaluating High throughput Chromatography for Process Characterization of Different Fc-based Modalities.** Catherine Grimm, Ashish Sharma, Balakumar Thangaraj, Amgen Inc., Cambridge, MA, USA
- 4:50 PM - 5:00 PM **Intermission**

Tuesday, July 9, 2019

7B. Tuesday Parallel Session: Stationary Phases - III

Session Chair: Marco Rito-Palomares, Tecnologico de Monterrey
Location: Constellation Ballroom D, 2nd floor

- 3:10 PM (L-216) **Downstream Process Development for a Clinical Stage Retrovirus like Particle.** Mark Snyder¹, Mark Fitchmun², ¹Bio-Rad Laboratories, Hercules, CA, USA; ²Somatek, San Diego, CA, USA
- 3:30 PM (L-217) **A New Chromatographic Approach to Quickly Assess ADCC Activity of Therapeutic Antibodies.** Leila Salim Abadi Ghaleh¹, Toru Tanaka², Egbert Muller³, ¹TU Darmstadt, Darmstadt, GERMANY; ²Tosoh Corporation, Shin-Nanyo, JAPAN; ³Tosoh Bioscience GmbH, Griesheim, GERMANY [presented by Werner Conze]
- 3:50 PM (L-218) **The Future of Protein A Affinity Chromatography.** Hans Johansson¹, Patrick Gilbert², Mark Hicks², ¹Purolite, Uppsala, SWEDEN; ²Purolite, Llantrisant, UK
- 4:10 PM (L-219) **Improved Key Quality Attributes of Antibody Purification Process.** Kajsa Eriksson, Cecilia Unoson, Lars Haneskog, Bio-Works, Uppsala, SWEDEN
- 4:30 PM (L-220) **Inline Concentration of Monoclonal Antibody Feed to Increase the Productivity of a Continuous Multi-column Chromatography Capture Step.** Thomas Elich, Herb Lutz, MilliporeSigma, Burlington, MA, USA
- 4:50 PM - 5:00 PM **Intermission**

8A. Tuesday Parallel Session: Alternative Chromatographic Processes

Session Chair: Shuichi Yamamoto, Yamaguchi University
Location: Constellation Ballroom C, 2nd floor

- 5:00 PM (L-221) **3-D Chromatography for Fab Fragment Purification.** Matthias Kubek¹, Matthias Fink¹, Clemens Schimek¹, Cecile Brocard², Gerald Striedner¹, Monika Cserjan¹, Rainer Hahn¹, ¹BOKU Vienna, Vienna, AUSTRIA; ²Boehringer Ingelheim RCV GmbH & Co KG, Vienna, AUSTRIA
- 5:20 PM (L-222) **Potential-controlled Chromatography – Innovative Alternative for Charged Molecule Separation.** Tatjana Trunzer, Paula Fraga-García, Sonja Berensmeier, Technical University of Munich, Garching, GERMANY
- 5:40 PM (L-223) **Development of Electro-Chromatography Methods and Application to Purification of Polymerized IgM.** Xun Zuo, Gregory Sabatino, Eric Routhier, Manish Makhija, Zhanling Wang, Joye Bramble, Eisai, Exton, PA, USA
- 6:00 PM (L-224) **The Purification of Monoclonal Antibodies using Novel Chromatofocusing Methods.** Yang Liu¹, Sevda Deldari¹, Hui Guo¹, Chittoor Narahari Rao², Ronald Bates³, Jay West⁴, Kathleen Trejo⁴, Ryan Swanson⁴, Sanchayita Ghose⁴, Zhengjian Li⁴, Douglas Frey¹, ¹University of Maryland Baltimore County, Baltimore, MD, USA; ²Moderna Therapeutics, Cambridge, MA, USA; ³Bristol-Myers Squibb, East Syracuse, NY, USA; ⁴Bristol-Myers Squibb, Devens, MA, USA
- 6:20 PM **Pause**

Tuesday, July 9, 2019

8B. Tuesday Parallel Session: Continuous Processes

Session Chair: Jose Paulo Mota, Universidade NOVA de Lisboa

Location: Constellation Ballroom D, 2nd floor

- 5:00 PM (L-225) **Continuous Downstream Purification of mAbs Enabled by Versatile Twin-Column Chromatography.** James Angelo¹, Kathleen Muhlbacher², ¹Bristol-Myers Squibb, Devens, MA, USA; ²YMC Process Technologies, Devens, MA, USA
- 5:20 PM (L-226) **Continuous Purifications in Multistep Continuous Flow Synthesis of Pharmaceutical Compounds.** Robert Orkenyi^{1,2}, ¹Budapest University of Technology and Economics, Budapest, HUNGARY; ²RotaChrom Technologies LLC, Dabas, HUNGARY
- 5:40 PM (L-227) **InnoPreP by Servier: The Innovative Preparative Chromatography: A Tool to Achieve Shorter Process Time and Faster Time to Market.** Christophe Berini, Daniel Dron, Servier - Oril Industrie, Bolbec, FRANCE
- 6:00 PM (L-228) **Assuring Bioburden Control in Continuous Downstream Processing.** Sandhya Manjunath¹, Ozan Otes², Hendrik Flato², Daniel Vazquez Ramirez², Britta Manser³, Marc Bisschops⁴, Florian Capito², ¹Pall Biotech, Westborough, MA, USA; ²Sanofi, Frankfurt, GERMANY; ³Pall Biotech, Basel, SWITZERLAND; ⁴Pall Biotech, Medemblik, NETHERLANDS
- 6:20 PM Pause

Wednesday, July 10, 2019

7:30 AM **Symposium Registration Open**

9. Wednesday Keynote Session: Peptides and Oligonucleotides

Session Chair: Olivier Dapremont, AMPAC Fine Chemicals

Location: Constellation Ballroom C/D, 2nd floor

8:30 AM (L-301) **Breaking the Yield-purity Trade-off in Preparative Purification of Peptide and Oligonucleotides using Twin-column Chromatography.** Thomas Muller-Spath¹, Massimo Morbidelli², ¹ETH Zurich & ChromaCon, Zurich, SWITZERLAND; ²ETH Zurich, Zurich, SWITZERLAND

8:50 AM (L-302) **Industrial Peptide Purification – Challenges and Concepts.** Ralf Eisenhuth, Bachem AG, Bubendorf, SWITZERLAND

9:10 AM (L-303) **Practical Application of a Model based Approach for Small Molecules and API/Intermediates within Johnson Matthey's Manufacturing Operations.** Paul O'Shaughnessy, Johnson Matthey Health, Reading, UK

9:30 AM (L-304) **Preparative Supercritical Fluid Chromatography Separation of Peptides: On the Issue of Solubility and Robustness.** Joakim Bagge¹, Martin Enmark¹, Marek Lesko¹, Emelie Glenne¹, Linda Thunberg², Annika Langborg Weinmann², Tomas Leek², Hanna Leek², Fredrik Lime³, Jorgen Samuelsson¹, Torgny Fornstedt¹, ¹Karlstad University, Karlstad, SWEDEN; ²AstraZeneca, Gothenburg, SWEDEN; ³Nouryon, Bohus, SWEDEN

9:50 AM (L-305) **Investigation of Impurity Profiles in Preparative HPLC Applications of Peptide APIs.** Fredrik Limé, Anneli Hermansson, Per Jageland, Therése Tran, Nouryon/Kromasil, Bohus, SWEDEN

10:10 AM **Presentation of Awards to Winners of the Best Poster Competition**

10:20 AM - 10:40 AM **Break**

10. Wednesday Session: Fundamentals Applied to Understand Chromatography Columns

Session Chair: Chen Wang, AbbVie

Location: Constellation Ballroom C/D, 2nd floor

10:40 AM (L-306) **Increasing Protein Dynamic Binding Capacity By using Binding Affinity to Manipulate Surface Diffusivity.** Ohnmar Khanal¹, Vijesh Kumar¹, Fabrice Schlegel², Abraham M. Lenhoff¹, ¹Department of Chemical and Biomolecular Engineering University of Delaware, Newark, DE, USA; ²Amgen Process Development One Kendall Square 360 Binney St., Cambridge, MA, USA

11:00 AM (L-307) **Domain Contributions to Selectivity in Bispecific Antibody Purification by Multimodal Chromatography.** Siddharth Parasnvis¹, Matthew Aspelund², Wai Keen Chung², Steven Cramer¹, ¹Rensselaer Polytechnic Institute, Troy, NY, USA; ²AstraZeneca, Gaithersburg, MD, USA

11:20 AM (L-308) **Quantification of Unfolding and Aggregation of Monoclonal Antibodies on Cation Exchange Resins.** Artur Stanczak¹, Krystian Baran², Izabela Poplewska², Dorota Antos², ¹Polpharma Biologics, Gdansk, POLAND; ²Rzeszow University of Technology, Rzeszow, POLAND

Wednesday, July 10, 2019

11:40 AM (L-309) **Quantifying the Importance of Radial Inhomogeneity in Preparative Chromatography Columns.** Dmytro Iurashev¹, Anna Christler¹, Susanne Schweiger², Astrid Dürauer², Alois Jungbauer², Jürgen Zanghellini¹, ¹Austrian Centre of Industrial Biotechnology, Vienna, AUSTRIA; ²University of Natural Resources and Life Sciences, Vienna, AUSTRIA

12:00 PM (L-310) **Implementation of a Generic Approach to Simplify Column Packing and Testing.** Arvid Rehm, Rentschler Biopharma SE, Laupheim, GERMANY

12:20 PM - 2:00 PM **Lunch Break**

11. Wednesday Session: Monoliths and Membrane Chromatography

Session Chairs: Sebastian Vogg, ETH Zurich and Yiran Wang, University of Virginia
Location: Constellation Ballroom C/D, 2nd floor

2:00 PM (L-311) **Rapid and Effective Separation of Targeting Glycoproteins using a Macroporous Sponge-monolith Modified with Lectins in Liquid Chromatography.** Takuya Kubo¹, Seiya Kato¹, Tetsuya Tanigawa², Toyohiro Naito¹, Koji Otsuka¹, ¹Kyoto University, Kyoto, JAPAN; ²Chemco Scientific Co. Ltd., Osaka, JAPAN

2:20 PM (L-312) **Monolithic Chromatography Strategies for the Purification of CD133+ Stem Cells.** Mirna Gonzalez-Gonzalez¹, Erika Arias², Karla Mayolo-Deloisa¹, Richard C. Willson³, Marco Rito-Palomares¹, ¹Tecnologico de Monterrey, Monterrey, MEXICO; ²Northwestern University, Chicago, IL, USA; ³University of Houston, Houston, TX, USA

2:40 PM (L-313) **Simultaneous Purification and Break-through Curve Analysis of Macromolecules on a Single Akta System.** Rok Ambrozic¹, Petra Modic¹, Gorazd Hribar², Ales Podgornik¹, ¹Faculty of Chemistry and Chemical Technology, Ljubljana, SLOVENIA; ²Lek d.d. Technical Development Biologics, Menges, SLOVENIA

3:00 PM (L-314) **Chromassette™, A 3D Printed Device, Contains a Lattice Structure Allowing for Enhanced Purification of Biologics on Previously Unachievable, Higher Performance Resins.** Kristi Haskins, Tomonori Shiotani, Yusaku Mizuguchi, Masayoshi Nagaya, JSR Life Sciences, Sunnyvale, CA, USA

3:20 PM (L-315) **Harvesting with Chromatography-improved Protein A Performance in Batch and Continuous Processes.** Chris Koehler, Hani El Sabbahy, Angelines Castro, 3M, St. Paul, MN, USA

3:40 PM - 4:10 PM **Break**

Wednesday, July 10, 2019

12. Wednesday Session: Applications to Virus, VLPs, and Plasmid Purification

Session Chair: Ales Podgornik, COBIK, Ljubljana

Location: Constellation Ballroom C/D, 2nd floor

- 4:10 PM (L-316) **Two-Step Purification Process for H1N1 Virus using Ion Exchange Resins.** Duy Tien Ta, Kai Ling Chu, Wei Zhang, Bioprocessing Technology Institute A*STAR, Singapore, SINGAPORE
- 4:30 PM (L-317) **Purification of Plasmid DNA for Gene Therapy and Genetic Vaccination.** Carsten Voss, Bio-Rad Laboratories GmbH, Munich, GERMANY
- 4:50 PM (L-318) **A Scalable Adenovirus Production Process, from Cell Culture to Purified Bulk.** Asa Hagner McWhirter, Magnus Bergman, Eva Blanck, Sara Haggblad-Sahlberg, Pelle Sjöholm, Maria Soultsioti, Sravani Musunuri, Anna Akerblom, Asa Lagerlof, Mats Lundgren, GE Healthcare, Uppsala, SWEDEN
- 5:10 PM (L-319) **Major Histocompatibility Complex Class II Multi-epitope Insert Improves Anion Exchange Chromatography Purification of Human Papilloma Virus 16 L1 Protein Expressed in E. coli without Affecting Folding Efficiency.** Kyle Saylor¹, Alison Waldman², Frank Gillam³, Chenming Zhang¹, ¹Virginia Tech, Blacksburg, VA, USA; ²North Carolina State University, Raleigh, NC, USA; ³Grifols, Durham, NC, USA
- 5:30-5:40 PM **CLOSING REMARKS**, Giorgio Carta, University of Virginia, Charlottesville, VA, USA
- 5:40 PM **FAREWELL MIXER**
PREP & ISPPP shared Mixer in ISPPP Exhibit/Poster Hall
Location: Constellation Ballroom E/F, 2nd floor

Poster Session 1 - Monday 2:00 - 3:20 PM

Posters in the P-100 series will be presented on Monday in Poster Session I @ 2:00 - 3:20 PM
Constellation Ballroom, 2nd floor

- P-M-101 **Collection of Peptide Drug and On-column Concentration with Ultra-fast Preparative Purification Liquid Chromatograph.** Yoshiyuki Watabe, Kosuke Nakajima, Yoshihiro Hayakawa, Shimadzu Corporation, Kyoto, JAPAN
- P-M-102 **Development of an Integrated Harvest and Process Chromatography Tool-box for High-cell Density E.Coli, Yeast, and Mammalian Cell Cultures.** Paul Gahr, Gerald Terfloth, Antonio Ubiera, GlaxoSmithKline, Upper Merion, PA, USA
- P-M-103 **Evaluation of High-throughput Micro-scale Down Models to Enable Accelerated Characterization of Antibody Downstream Manufacturing Process.** Johanna Gervais, Diana Kang, Chen Wang, AbbVie Bioresearch Center, Worcester, MA, USA
- P-M-104 **HPMA as Carrier of 3-3-diindolylmethane Derivate: its Conjugation and Purification Process.** Eddie Robles-Garza, Calef Sanchez-Trasvina, Fabiola Castorena-Torres, Karla Mayolo-Deloisa, Marco Rito-Palomares, Tecnologico de Monterrey, Monterrey, MEXICO
- P-M-105 **Structure and Protein Adsorption Behavior of Cpto™ Core 700 Resin.** Calef Sanchez-Trasvina¹, Preston Fuks², Christiane Mushagasha², Karla Mayolo-Deloisa¹, Marco Rito-Palomares¹, Giorgio Carta², ¹Tecnologico de Monterrey, Monterrey, MEXICO; ²University of Virginia, Charlottesville, VA, USA
- P-M-106 **Developing Intelligent High-pressure Pumps with a Wide Operation Range for Next Generation of Process Chromatography Applications.** Hans-Joachim Jöhl, Waldemar Horn, LEWA, Leonberg, GERMANY
- P-M-107 **Pesticide Classification System in the Isolation of Cannabidiol using Centrifugal Partition Chromatography.** Arpad Konczol¹, Dora Rutterschmid¹, Robert Orkenyi^{1,2}, ¹Budapest University of Technology and Economics, Budapest, HUNGARY; ²RotaChrom Technologies LLC, Dabas, HUNGARY
- P-M-108 **Error Modeling in Chromatography and Parameter Confidence.** William Heymann, Eric von Lieres, Forschungszentrum Julich, Julich, GERMANY
- P-M-109 **Continuous Capture Chromatography as an Integrated Downstream Purification Platform for mAbs.** Jared Steffy¹, Lindsay Arnold¹, Kathleen Muhlbachler², ¹MedImmune, Gaithersburg, MD, USA; ²YMC Process Technologies, Devens, MA, USA
- P-M-110 **Isolation of Pharmaceutical Degradants using Supercritical Fluid Chromatography (SFC).** Paul Lefebvre, Alexander Neue, Cindy Berger, Heather Lane, Averca Discovery Services, Marlborough, MA, USA
- P-M-111 **Semi-prep FcR Column for Separation of Monoclonal Antibody based on the Differences of N-glycans.** Ryoko Otake, Yosuke Terao, Tosoh Corporation, Ayase, JAPAN
- P-M-112 **Protein A Chromatography as a Polishing Step in a Downstream Bioprocess?** Ehsan Espah Borujeni, William Rayfield, Sandra Rios, Merck Co. & Inc., Kenilworth, NJ, USA

Poster Session 1 - Monday 2:00 - 3:20 PM

Posters in the P-100 series will be presented on Monday in Poster Session I @ 2:00 - 3:20 PM

Constellation Ballroom, 2nd floor

- P-M-113 **Development of a Novel Fiber-based Chromatography Platform to Break Downstream Bottlenecks.** Ian Scanlon¹, Oliver Hardick¹, Peter Guterstam², Linnea Troeng², Lotta Hedkvist², Penny Hamlyn³, Peter Lundback², John Jenco⁴, ¹GE Healthcare, Stevenage, UK; ²GE Healthcare, Uppsala, SWEDEN; ³GE Healthcare, Little Chalfont, UK; ⁴GE Healthcare, Marlborough, MA, USA
- P-M-114 **Scale Up of a Chromatographic Capture Step for a Clarified Bacterial Homogenate—Influence of Feed Viscosity and Competitive Adsorption of Impurities.** Michal Kolodziej¹, Dominik Sauer², Juergen Beck³, Wojciech Marek¹, Rainer Hahn³, Astrid Duerauer³, Alois Junbauer³, Wojciech Piatkowski¹, Dorota Antos¹, ¹Rzeszow University of Technology, Rzeszow, POLAND; ²Austrian Centre of Industrial Biotechnology, Vienna, AUSTRIA; ³Department of Biotechnology, Vienna, AUSTRIA
- P-M-115 **Prediction of Peak Variances and Mass Transfer Coefficients in Linear pH and Salt Gradient Elution.** Jan Hedrich¹, Romas Skudas², Michael M. Schulte², Christian Frech¹, ¹University of Applied Sciences, Mannheim, GERMANY; ²Merck KGaA, Darmstadt, GERMANY
- P-M-116 **Modeling and Process Development for Protein Separation by Flow-through Chromatography.** Chyi-Shin Chen, Sumiko Hasegawa, Noriko Yoshimoto, Shuichi Yamamoto, Biomedical Engineering Center (YUBEC) Yamaguchi University, Ube, JAPAN
- P-M-117 **Use of 3D Printing to Improve Plug-flow Recycling in Batch Chromatography with Recycle Lag.** Abimaelle Chiberio, Gonçalo Policarpo, Tiago Santos, João Antunes, José Paulo Mota, NOVA University of Lisbon, Lisbon, PORTUGAL
- P-M-118 **Exploiting the Analogy between Carbon Nanotubes and Proteins to Develop Novel Separation Methods.** Payam Rezaei¹, Lisa Pfefferle², Douglas Frey¹, ¹University of Maryland Baltimore County, Baltimore, MD, USA; ²Yale University, New Haven, CT, USA
- P-M-119 **Recombinant Protein Purification from E. coli Fermentate with Mixed-mode Chromatography Resins.** William Rushton¹, David Frisch², Hyunsic Choi², ¹Bio-Rad Laboratories, Hercules, CA, USA; ²Scarab Genomics, Madison, WI, USA
- P-M-120 **Recombinant Monoclonal Antibody – Rituximab Biosimilar – Alternate Non-affinity based Chromatographic Purification Process.** Anton Posch¹, Chelsea Pratt², Laura Moriarty², Payal Khandelwal², Jiali Liao², ¹Bio-Rad Laboratories, Munich, GERMANY; ²Bio-Rad Laboratories, Hercules, CA, USA
- P-M-121 **Elucidation of Retention Behaviors in Reversed-phase Liquid Chromatography as a Function of Mobile Phase Composition.** Hung-Wei Tsui, Che-Hung Kuo, Yung-Chen Huang, National Taipei University of Technology, Taipei, TAIWAN
- P-M-122 **Preparative Separation of Phosphorothioated Antisense Oligonucleotides.** Martin Enmark¹, Joakim Bagge¹, Jorgen Samuelsson¹, Linda Thunberg², Hanna Leek², Fredrik Lime³, Per Jageland³, Torgny Fornstedt¹, ¹Karlstad University, Karlstad, SWEDEN; ²AstraZeneca, Gothenburg, SWEDEN; ³Nouryon, Bohus, SWEDEN
- P-M-123 **Hydrophobic Interaction Chromatography Cleaning to Achieve Facility Fit in a Next-gen Enzyme Manufacturing Facility: Considerations for Cycling Study Design.** Arijun Bhadouria, Mary Kilroy, Tarl Vetter, Kevin Brower, Rohan Patil, Jason Walther, Sanofi, Framingham, MA, USA

Poster Session 1 - Monday 2:00 - 3:20 PM

Posters in the P-100 series will be presented on Monday in Poster Session I @ 2:00 - 3:20 PM
Constellation Ballroom, 2nd floor

- P-M-124 **Impact of Plant Cultivation on the Chromatographic Behavior of Host Cell Proteins Purified from Different Nicotiana Species.** Jan Wilhelm Huebbers¹, Catherine Rose Mueschen¹, Johannes Felix Buyel^{1,2}, ¹Fraunhofer Institute for Molekular Biology and Applied, Aachen, GERMANY; ²Institute for Molecular Biology RWTH Aachen University, Aachen, GERMANY
- P-M-125 **Analysis of Chromatographic Column Performance during Resin Lifetime Studies using Data Mining Methods.** Chris Gerberich, Yanhong Feng, Sam Flores, Myles Boyd, André Dumetz, Gerald Terfloth, GlaxoSmithKline, King of Prussia, PA, USA
- P-M-126 **Prediction of Protein Mixture Elution on Anion Exchangers.** Catherine Mueschen, Fraunhofer IME, Aachen, GERMANY
- P-M-127 **Continuous Purifications in Multistep Continuous Flow Synthesis of Pharmaceutical Compounds.** Robert Orkenyi^{1,2}, ¹Budapest University of Technology and Economics, Budapest, HUNGARY; ²RotaChrom Technologies LLC, Dabas, HUNGARY
- P-M-128 **Improved Key Quality Attributes of Antibody Purification Processes.** Kajsa Eriksson, Cecilia Unoson, Lars Haneskog, Bio-Works, Uppsala, SWEDEN
- P-M-129 **Mixed PEL Brush Modified Porous Chromatography Media for pH Modulated Protein Separations.** Thantawat Theeranan, Owen R.T. Thomas, University of Birmingham, Birmingham, UK
- P-M-130 **Quantifying the Importance of Radial Inhomogeneity in Preparative Chromatography Columns.** Anna Christler¹, Dmytro Iurashev¹, Susanne Schweiger², Astrid Dürauer², Alois Jungbauer², Jürgen Zanghellini², ¹Austrian Centre of Industrial Biotechnology, Vienna, AUSTRIA; ²University of Natural Resources and Life Sciences, Vienna, AUSTRIA
- P-M-131 **Advantage of Antibody Based Selectivity in the Purification of Biologics.** Jessica de Rooij¹, Frank Detmers¹, Pim Hermans¹, Hendrik Adams¹, Orjana Terova², ¹Thermo Fisher Scientific, Leiden, NETHERLANDS; ²Thermo Fisher Scientific, Bedford, MA, USA
- P-M-132 **From Preparative Batch Chromatography to a 2-Column Multicolumn Countercurrent Solvent Gradient Purification (MCSGP) Process for the Purification of a Peptide Crude Mixture.** Chiara De Luca¹, Sebastian Vogg², Martina Catani¹, Marco Macis³, Antonio Ricci³, Alberto Cavazzini¹, Massimo Morbidelli², ¹University of Ferrara, Ferrara, ITALY; ²ETH Zurich, Zurich, SWITZERLAND; ³Fresenius Kabi iPSUM, Villadose (RO), ITALY
- P-M-133 **Separation of Empty and Full Adeno-Associated Viral Vectors (AAV) using Scalable Ion Exchange Chromatography.** Chris Argento, Ryan Dickerson, Meisam Bakhshayeshi, Biogen, Cambridge, MA, USA
- P-M-134 **Flash Purification Methodology for Synthetic Peptides.** Marc Jacob, J Preston, Phenomenex, Torrance, CA, USA
- P-M-135 **A Robust Study in Column Packing of Amsphere A3 from Lab to Manufacturing Scale.** Tomonori Shiotani¹, Yusaku Mizuguchi¹, Kristi Haskins¹, Jason Chiu², Masayoshi Nagaya², Kaori Itaya³, Ryo Doi³, Gerald Platteau⁴, ¹JSR Life Sciences, NC, USA; ²JSR Life Sciences, CA, USA; ³JSR Life Sciences, JAPAN; ⁴JSR Life Sciences, BELGIUM

Poster Session 1 - Monday 2:00 - 3:20 PM

Posters in the P-100 series will be presented on Monday in Poster Session I @ 2:00 - 3:20 PM
Constellation Ballroom, 2nd floor

- P-M-136 **Breaking the Yield-Purity Trade-off in Preparative Purification of Peptide and Oligonucleotides.** Thomas Muller-Spath¹, Richard Weldon¹, Massimo Morbidelli², ¹YMC ChromaCon, Zurich, SWITZERLAND; ²ETH Zurich, Zurich, SWITZERLAND
- P-M-137 **Regularities and Anomalies in Modeling Protein Elution in Ion-exchange Chromatography.** Vijesh Kumar¹, Fabrice Schlegel², Oliver Kaltenbrunner², Abraham Lenhoff¹, ¹University of Delaware, Newark, DE, USA; ²Amgen, Cambridge, MA, USA
- P-M-138 **Spreading Kinetic Model for mAb Monomer-Dimer Mixtures on Ceramic Hydroxyapatite.** Yiran Wang, Giorgio Carta, University of Virginia, Charlottesville, VA, USA
- P-M-139 **Evaluation the Control of Host Cell Proteins (HCPs) in a NS0 Cell Bioprocess.** Juan Wang, Bristol-Myers Squibb, Devens, MA, USA
- P-M-140 **Rapid Sanitization of Protein A Resin in Bioprocess Columns using a Sporicidal Agent.** Johan Avallin¹, Anders Nilsson¹, Henrik Ingvarsson¹, Anna Gronberg¹, Magnus Asplund¹, Eva Blanck¹, Linda Persson¹, Reinhard Braaz², Joseph Vinnemeier², Philip Lester², ¹GE Healthcare, Uppsala, SWEDEN; ²Roche, Penzberg, GERMANY
- P-M-141 **Improving mAbs Purification Process using a High Capacity Anion Exchange Resin Coupled with Buffer Modulation.** Quanxuan Zhang, Rudrajit Mal, Bhaktavachalam Thiyagarajan, Nandu Deorkar, Avantor, Bridgewater, NJ, USA
- P-M-142 **Modification of Sarkosyl Concentration to Facilitate Virus like Particle (VLP) Purification through Diethylaminoethyl (DEAE) Chromatography.** Yi Lu, Frank Gillam, Chenming Zhang, Virginia Tech, Blacksburg, VA, USA
- P-M-143 **Fast and Easy Injection of Large Sample Volumes in Preparative HPLC.** Ronald Guilliet¹, Florian Rieck², ¹Agilent, Middelburg, NETHERLANDS; ²Agilent, Waldbronn, GERMANY
- P-M-144 **Organic Phase Injection in Reversed Phase Liquid Chromatography for High-Concentration Samples.** Ronald Guilliet¹, Lena Höninger², Florian Rieck², ¹Agilent, Middelburg, NETHERLANDS; ²Agilent, Waldbronn, GERMANY
- P-M-145 **Biomacromolecule Separation using Sepax Monomix MC SEC Bulk Media.** Huiming Mao¹, Ke Yang¹, Xueying Huang¹, Huhua Chen², Xinmei Hu², ¹Sepax Technologies, Inc., Newark, DE, USA; ²Sepax Technologies, Inc., Suzhou, CHINA
- P-M-146 **Downstream Process Development of Monoclonal Antibodies in High-yield and High-purity by Affinity and Ion-exchange Chromatography.** Masatoshi Taniguchi¹, Tetsuo Fukuta², Kaori Itaya², Makoto Higami², Masaaki Hanamura², Noritaka Kuroda¹, Naohiro Kuriyama¹, ¹YMC Co., Ltd., Kyoto, JAPAN; ²JSR Corporation, Tokyo, JAPAN [presented by Jeffrey Kakaley]
- P-M-147 **Viral Clearance Strategy for POROS Hydrophobic Interaction Chromatography.** John Li¹, Moira Lynch¹, David Cetlin², Stephen Stoltzfus³, Abbie Hevner³, Nicholas Decandia³, Jessica De Rooij¹, Orjana Terova¹, ¹Thermo Fisher Scientific, Bedford, MA, USA; ²Mock V Solutions, Rockville, MD, USA; ³Eurofins Lancaster Laboratories, Lancaster, PA, USA
- P-M-148 **Increased Productivity with Single-use Membrane Chromatography.** Daniela Soluk¹, Ricarda Busse², ¹Sartorius Stedim Biotech, Bohemia, NY, USA; ²Sartorius Stedim Biotech, Gottingen, GERMANY

Poster Session 1 - Monday 2:00 - 3:20 PM

Posters in the P-100 series will be presented on Monday in Poster Session I @ 2:00 - 3:20 PM
Constellation Ballroom, 2nd floor

- P-M-149 **Characterization of Tryptamine-coupled Resin for Affinity Purification of Human IgG.** H. Michelle Rakotondravao¹, Ayaka Ohara¹, Naohiro Kuriyama², Noritaka Kuroda², Masatoshi Taniguchi², Yumiko Sakoda², Jun-Ichi Horiuchi¹, Yoichi Kumada¹, ¹Kyoto Institute of Technology, Kyoto, JAPAN; ²YMC, Kyoto, JAPAN
- P-M-150 **Reversible, Three-peak Elution Behavior of Bivalent Bispecific Antibodies on Hydrophobic Interaction Chromatography Columns.** Lucas Kimerer¹, Timothy Pabst², Alan Hunter², Giorgio Carta¹, ¹University of Virginia, Charlottesville, VA, USA; ²AstraZeneca, Gaithersburg, MD, USA
- P-M-151 **Continuous Monitoring of Antibody Column Breakthrough by Fluorescence Polarization and Fluorescence Intensity.** Ujwal Patil, Mary Crum, Binh Vu, Katerina Kourentzi, Richard C. Willson, University of Houston, Houston, TX, USA
- P-M-152 **Osmolality is a Predictor for Model based Real Time Monitoring of Concentration in Protein Chromatography.** Edit Feldfödi¹, Theresa Scharl-hirsch¹, Astrid Duerauer², Kristeena Wright³, Alois Jungbauer², ¹acib, Vienna, AUSTRIA; ²BOKU, Vienna, AUSTRIA; ³Alcomapnies, Norwood, MA, USA
- P-M-153 **Dispersive Pipette Extraction for 3-5 mL Sample Volumes using Automated Liquid Handling Systems to Increase Purification Throughput.** P. Nikki Sitasuwan, Todd Mullis, Huey Nguyen, L. Andrew Lee, IMCS, Inc., Irmo, SC, USA
- P-M-154 **Preparation of Tertiary Amine Functionalized Sepharose Fast Flow Resins.** Tingyu Li¹, David Vanderah², ¹National Science Foundation, Alexandria, VA, USA; ²NIST IBBR, Rockville, MD, USA
- P-M-155 **HIV Aids Test Report for the People of Geita Region – Tanzania.** Vivian Bengesi, Geita Regional Hospital, Geita, TANZANIA
- P-M-156 **Practical Application of a Model Based Approach to Process Chromatography for Small Molecules and API/Intermediates within Johnson Matthey Health's Manufacturing Operations.** Paul O'Shaughnessy¹, Adam Turner², ¹Johnson Matthey Technology Centre, Reading, UK; ²Johnson Matthey Heath, Devens, MA, USA
- P-M-157 **3D Printed Monoliths with Quaternary Amine Functionality for Protein Separations.** Ursula Simon, Simone Dimartino, University of Edinburgh, Edinburgh, UK

Poster Session 2 - Tuesday 1:50 - 3:10 PM

Posters in the P-200 series will be presented on Tuesday in Poster Session I @ 1:50 - 3:10 PM

Constellation Ballroom, 2nd floor

- P-T-201 **Three Unique Cation Exchange Resins Sharing a Common Base Bead.**
Joaquin Umana, Matthew T. Stone¹, Romas Skudas², Peter Menstell², Heiner Graalfs²,
¹MilliporeSigma, Bedford, MA, USA; ²Merck KGaA, Darmstadt, GERMANY
- P-T-202 **Penetrating and Non-penetrating Tracer for the Empiric Determination of Column Porosities used in Chromatography Modelling – A Long and Winding Road.**
Catherine Müschen, Ronald Jäpel, Johannes Buyel, Fraunhofer IME, Aachen, GERMANY
- P-T-203 **Purification of Infectious Adenovirus using Ceramic Hydroxyapatite Column.**
Yae Kurosawa, HOYA Technosurgical Corporation, Tokyo, JAPAN
- P-T-204 **A Fully Scalable Platform for the Production and Purification of Magnetosomes.**
Hong Li¹, Alfred Fernández-Castané², Moritz Eberle³, Matthias Franzreb³, Tim W. Overton¹, Owen R.T. Thomas¹, ¹University of Birmingham, Birmingham, UK; ²Aston University, Birmingham, UK; ³Karlsruhe Institute of Technology, Karlsruhe, GERMANY
- P-T-205 **Reduce Risk of Failure in Virus Clearance Studies using Robust Scale-down Chromatography Tools.** Tina Pitarresi, Linnea Troeng, GE Healthcare, Uppsala, SWEDEN
- P-T-206 **Rapid Resolution of Isomers from Chiral Molecules with Multiple Stereocenters.**
Paul Lefebvre, Alexander Neue, Cindy Berger, Heather Lane, Averca Discovery Services, Marlborough, MA, USA
- P-T-207 **Influenza Virus Capture using Membrane Chromatography: Improving Selectivity by Matrix Design and Pseudo-affinity Ligand Interactions.** Florian Taft¹, Ana Raquel Fortuna¹, Michael Wolff², Udo Reich³, Volkmar Thom¹, ¹Sartorius Stedim GmbH, Goettingen, GERMANY; ²Institute of Bioprocess Engineering and Pharmaceutical Technology, University of Applied Sciences Mittelhessen and Max Planck Institute for Dynamics of Complex Technical Systems, Giessen, GERMANY; ³Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, GERMANY
- P-T-208 **Flocculation and Synthetic Depth Filtration for Increased Purity and Reduced Turbidity of a mAb Product.** Dominick Groux, George Weeden, Adam Meizinger, Carl Beigie, Sanofi Genzyme, Framingham, MA, USA
- P-T-209 **Purification of a Recombinant Bacterial DyP-peroxidase with a Hydrophobic Anion Exchange Resin.** Nikola Loncarb¹, Natasa Bozica², Marinela Sokarda Slavica², Marco Fraaijeb¹, Zoran Vujcicc², Payal Khandelwal³, ¹University of Groningen, Groningen, NETHERLANDS; ²University of Belgrade, Belgrade, SERBIA; ³Bio-Rad Laboratories, Hercules, CA, USA
- P-T-210 **Mitigation of Protein Transport Limitations during Multimodal Chromatography Process Development.** Stijn Hendrik Simon Koshari, Hong Zhang, Robert G Luo, GlaxoSmithKline, King of Prussia, PA, USA
- P-T-211 **Did You Know that Magnetic Separation for Proteins does not have to be Expensive?** Silvia Blank-Shim, Sebastian Schwaminger, Alexander Zanker, Paula Fraga García, Sonja Berensmeier, Technical University of Munich, Garching, GERMANY
- P-T-212 **Efficient Protection of Protein A Resins during mAb Purifications.** Cecilia Unoson, Kaisa Eriksson, Lars Haneskog, Bio-Works, Uppsala, SWEDEN

Poster Session 2 - Tuesday 1:50 - 3:10 PM

Posters in the P-200 series will be presented on Tuesday in Poster Session I @ 1:50 - 3:10 PM
Constellation Ballroom, 2nd floor

- P-T-213 **Chromalite M: A Novel Range of Methacrylic Polymers with High Performance in Chromatographic Bio-Separations.** Benjamin Summers, Alessandra Basso, Simona Serban, Purolite Ltd., Llantrisant, UK
- P-T-214 **Automated End-to-end Integrated Manufacturing of an Antibody.** Sebastian Vogg, Moritz Wolf, Fabian Feidl, Nicole Ulmer, Ruben Wälchli, Massimo Morbidelli, ETH Zurich, Zurich, SWITZERLAND
- P-T-215 **Assuring Bioburden Control in Continuous Downstream Processing.** Ozan Otes¹, Hendrik Flato¹, Daniel Vazquez-Ramirez¹, Britta Manser², Marc Bisschops³, Florian Capito¹, Sandhya Manjunath⁴, ¹Sanofi-Aventis, Frankfurt, GERMANY; ²Pall Biotech, Basel, SWITZERLAND; ³Pall Biotech, Medemblik, NETHERLANDS; ⁴Pall Biotech, Westborough, MA, USA
- P-T-216 **Sample Loadability on Coated and Immobilized Polysaccharide-Based CSPs.** Gay Lowden, Edward Franklin, Regis Technologies, Inc., Morton Grove, IL, USA
- P-T-217 **Purification of Protein Solutions based on Diffusion through a Thin Liquid Barrier using Continuous SPLITT Fractionation System.** Soheyl Tadjiki, Robert Reed, Postnova Analytics, Salt Lake City, UT, USA
- P-T-218 **Reversible Three Peak Behavior of Bivalent Bispecific Antibodies on Cation Exchange Columns.** Lucas Kimerer¹, Tim Pabst², Alan Hunter², Giorgio Carta¹, ¹University of Virginia, Charlottesville, VA, USA; ²AstraZeneca, Gaithersburg, MD, USA
- P-T-219 **Sweet, Sweeter - Stevia – From Analytical Method Development to a Robust and Effective Preparative HPLC Online SPE Purification Method for Steviolglycosides.** Yannick Krauke, Juliane Boettcher, Johannes Menke, Kate Monks, KNAUER Wissenschaftliche Geräte GmbH, Berlin, GERMANY
- P-T-220 **Modeling the Nonlinear Behavior of a Bioactive Peptide in Reversed-Phase Gradient Elution Chromatography.** Martina Catani¹, Chiara De Luca¹, Simona Felletti¹, Marco Macis², Antonio Ricci², Massimo Morbidelli³, Alberto Cavazzini¹, ¹University of Ferrara, Ferrara, ITALY; ²Fresenius Kabi iPSUM, Villadose (Rovigo), ITALY; ³ETH Zurich, Zurich, SWITZERLAND
- P-T-221 **Chromassette™, A 3D Printed Device, Contains a Lattice Structure Allowing for Enhanced Purification of Biologics on Previously Unachievable, Higher Performance Resins.** Kristi Haskins¹, Tomonori Shiotani¹, Yusaku Mizuguchi¹, Masayoshi Nagaya², ¹JSR Life Sciences, Durham, NC, USA; ²JSR Life Sciences, Sunnyvale, CA, USA
- P-T-222 **Peak Deconvolution of Multicomponent Protein Mixtures: A Method to Rapidly Determine Product Retention and Identify Orthogonal Chromatographic Steps.** Scott Altern¹, Nicholas Vecchiarello², Camille Bilodeau¹, Steven Cramer¹, ¹Rensselaer Polytechnic Institute, Troy, NY, USA; ²Amgen, Cambridge, MA, USA
- P-T-223 **Bringing Down the Cost of MAb Purification with a New Protein A Resin and Intensified Batch Processing.** Hans Johansson, Purolite, Uppsala, SWEDEN
- P-T-224 **SFC Isolation of THCA and CBDA from Cannabis using a New Developed Chromatography Column.** Matthew Przybyciel, ES Industries, West Berlin, NJ, USA

Poster Session 2 - Tuesday 1:50 - 3:10 PM

Posters in the P-200 series will be presented on Tuesday in Poster Session I @ 1:50 - 3:10 PM
Constellation Ballroom, 2nd floor

- P-T-225 **A Hydrophobic Anion Exchange Resin for Refined Selectivity and Recovery.** Xuemei He, Irene Chen, Louisa Vang, Walt Eggert, Mark A. Snyder, Bio-Rad, Hercules, CA, USA
- P-T-226 **Understanding Fouling Mechanisms of Direct Filtration during Process Development for Monoclonal Antibody Harvest.** Hong Zhang, Stijn Koshari, Kusum Solanki, Hiren Ardeshna, Robert Luo, GlaxoSmithKline, King of Prussia, PA, USA
- P-T-227 **Understanding Tangential Flow Filtration Behavior of Antibody-Drug Conjugates.** Ryan Bean, Michaela Wendeler, Kelly Wilson, James Howard, AstraZeneca, Gaithersburg, MD, USA
- P-T-228 **Preparative Supercritical Fluid Chromatography Separation of Peptides: On the Issue of Solubility and Robustness.** Joakim Bagge¹, Martin Enmark¹, Marek Lesko¹, Emelie Glenne¹, Linda Thunberg², Annika Langborg Weinmann², Tomas Leek², Fredrik Limé³, Jörgen Samuelsson¹, Torgny Fornstedt¹, ¹Karlstad University, Karlstad, SWEDEN; ²AstraZeneca, Gothenburg, SWEDEN; ³Nouryon, Bohus, SWEDEN
- P-T-229 **Viral Clearance Validation for Two-Column Continuous Protein A Chromatography.** Kevin Potter¹, James Angelo¹, Srinivas Chollangi¹, Anthony Cura¹, Thomas Muller-Spath², Simona Jusyte³, Xuankuo Xu¹, Sanchayita Ghose¹, ¹Bristol-Myers Squibb, Devens, MA, USA; ²ChromaCon, Zurich, SWITZERLAND; ³Wuxi Apptec, Philadelphia, PA, USA
- P-T-230 **Effect of pH and Salt Gradient on Anion Exchange Columns for the Purification of Plasma Proteins.** Camila Oliveira Carneiro, Livia Aleixo Cunha, Claudia Iwashita Verinaud, Elizabeth Angélica Leme Martins, Isaias Raw, Elisabeth Cheng, Butantan Insitute, Sao Paulo, BRAZIL
- P-T-231 **An Efficient Process for Mass Directed Reverse Phase Purification of Peptide Libraries for Drug Discovery.** Adam Beard¹, Miroslawa Darlak¹, Lisa Nogle¹, David Smith¹, Spencer McMinn¹, Mark Pietrafitta¹, Sharon Wilhelm², Erik Streckfuss³, Blair Zartman³, Michael Garrigou¹, Nicolas Boyer¹, Min Liu⁴, Helen Mitchell³, Nunzio Sciammetta¹, ¹Merck, Boston, MA, USA; ²Merck, Cambridge, MA, USA; ³Merck, West Point, PA, USA; ⁴Merck, Kenilworth, NJ, USA
- P-T-232 **Generic Approach for Chromatography Column Packing and Testing.** Arvid Rehm, Mario Grünberg, Anna Fochler, Antje Böttinger, Alexander Faude, Matthias Kron, Rentschler Biopharma SE, Laupheim, GERMANY
- P-T-233 **Protein Equilibrium Adsorption and Kinetics on Multimodal Anion Exchange Chromatography Resins.** Joey Roberts, Giorgio Carta, University of Virginia, Charlottesville, VA, USA
- P-T-234 **DBC Study of Daisogel AF Series.** Masashi Jousha, Kazu Kudo, Tetsuyuki Saika, DAISO Fine Chem USA, Inc., Torrance, CA, USA
- P-T-235 **Efficient mAb Purification in Flow through – Flow through Mode with Cellulose based Chromatography Resins (Cellufine™).** Kojiro Soda¹, Yoshihiro Matusmoto¹, Tsuyoshi Nakama¹, Shigeyuki Aoyama², ¹JNC Corporation, Yokohama, JAPAN; ²JNC Corporation, Tokyo, JAPAN

Poster Session 2 - Tuesday 1:50 - 3:10 PM

Posters in the P-200 series will be presented on Tuesday in Poster Session I @ 1:50 - 3:10 PM

Constellation Ballroom, 2nd floor

- P-T-236 **Preparation of 4000-6000 Angstrom Pore-sized Gigaporous Anion Exchange Chromatography Resin and Its Application for Oncolytic Virus Purification.** Jinsong Liu¹, Baisheng Jin², Shengyue Lin², Rongji Chen², Biwang Jiang², ¹Suzhou Nanomicro Technologies Company Ltd., Hopkinton, MA, USA; ²Suzhou Nanomicro Technologies Company, Suzhou, CHINA
- P-T-237 **Increasing Protein Dynamic Binding Capacity by using Binding Affinity to Manipulate Surface Diffusivity.** Ohnmar Khanal¹, Vijesh Kumar¹, Fabrice Schlegel², Abraham Lenhoff¹, ¹University of Delaware, Newark, DE, USA; ²Amgen, Cambridge, MA, USA
- P-T-238 **Virus Clearance with Continuous Multi Column Chromatography.** Jason Forte¹, Mark Pagkaliwangan¹, Meng-Jung Chiang², Scott Lute², Denis Kole¹, Krunal Mehta³, Glen Bolton³, Mark Schofield¹, Kurt Brorson², ¹Pall Biotech, Westborough, MA, USA; ²U.S. Food and Drug Administration, Silver Spring, MD, USA; ³Amgen, Cambridge, MA, USA
- P-T-239 **Accelerating Antibody Drug Development with Subdomain-Specific Affinity Ligands.** Pim Hermans¹, Frank Detmers¹, Bruce Dawson², ¹Thermo Fisher Scientific, Leiden, NETHERLANDS; ²Thermo Fisher Scientific, Wilmington, NC, USA
- P-T-240 **Development of an Improved Amylose-based Chiral Stationary Phase with Excellent Preparative Performance.** Tsuyoshi Watabe, Masahide Kobayashi, Eika Otsuka, Akinari Awatani, Keiko Kihara, Saoko Nozawa, Noritaka Kuroda, YMC Co., Ltd., Kyoto, JAPAN (presented by Jeffrey Kakaley)
- P-T-241 **Novel Polymer-type Through-porous Particles as Purification Media for IgG.** Ryosuke Takahashi¹, Ryota Wada¹, Emi Ichihashi¹, Masatoshi Taniguchi¹, Noritaka Kuroda¹, Naohiro Kuriyama¹, Norio Ishizuka², ¹YMC Co., Ltd., Kyoto, JAPAN; ²Emaus Kyoto Inc., Kyoto, JAPAN
- P-T-242 **The Impact of Pore Size and Selectivity for Reversed Phase Purification of Insulin.** Priya Jayaraman¹, Sami Chanaa¹, Andrew Coffey², Ronald Guilliet³, ¹Agilent Technologies, Wilmington, DE, USA; ²Agilent Technologies, Church Stretton, UK; ³Agilent Technologies, Middelburg, NETHERLANDS
- P-T-243 **Scouting, Purification, and Re-analysis on a Combined Analytical and Preparative LC/MS System.** Ronald Guilliet¹, Florian Rieck², Irina Spuling², ¹Agilent, Middelburg, NETHERLANDS; ²Agilent, Waldbronn, GERMANY
- P-T-244 **Development of a 2-Step Liraglutide Purification Process on a Single Stationary Phase.** Marc Jacob, Phenomenex, Torrance, CA, USA
- P-T-245 **Polymeric Ion Exchange Process Media for Bio-molecule Separation with High Resolution.** Ke Yang¹, Xinmei Hu², Huiming Mao¹, Xueying Huang¹, ¹Sepax Technologies, Inc., Newark, DE, USA; ²Sepax Technologies, Inc., Suzhou Jiangsu, CHINA
- P-T-246 **Biomacromolecule Separation using Sepax PolyRP Bulk Media.** Huiming Mao¹, Ke Yang¹, Xueying Huang¹, Yi Wang², Xinmei Hu², ¹Sepax Technologies, Inc., Newark, DE, USA; ²Sepax Technologies, Inc., Suzhou, CHINA

Poster Session 2 - Tuesday 1:50 - 3:10 PM

Posters in the P-200 series will be presented on Tuesday in Poster Session I @ 1:50 - 3:10 PM
Constellation Ballroom, 2nd floor

- P-T-247 **Methods for Detecting Unfolding of Monoclonal Antibodies on Cation Exchange Resins.** Artur Stanczak¹, Krystian Baran², Bartłomiej Filip², Dorota Antos², ¹Polpharma Biologics, Gdansk, POLAND; ²Politechnika Rzeszowska, Rzeszow, POLAND
- P-T-248 **Centrifugal Partitioning Chromatography (CPC) for Isolation of Cannabinoids from Cannabis Extracts.** Robert Driscoll, Robatel Inc., Pittsfield, MA, USA
- P-T-249 **Implementation of Simulated Moving Bed (SMB) Chromatography in Continuous Vaccine Processing.** Tiago Matos, David Hoying, Adam Kristopeit, Marc Wenger, Merck & Co., Inc., West Point, PA, USA
- P-T-250 **High Throughput Screening Investigation of Flowthrough HIC.** Allyson Tucker, Joanne Gilchrist, Bradford Stanley, Biogen, RTP, NC, USA
- P-T-251 **Agilent InfinityLab Purification Solutions: Automated Delay Time Calibration for UV and MS Peak-based Fraction Collection.** Gina Black, Agilent, Cranford, NJ, USA
- P-T-252 **Development of In Silico Tools to Predict the Behaviour of Monoclonal Antibodies in POROS™ XS Cation Exchange Chromatography.** Shamma Mehnaz¹, Rhesa Budhidarmo¹, Mary Lunson¹, Simeon Georgiev², Olga Obrezanova², Jean Aucamp¹, ¹Lonza Biologics Plc, Slough, UK; ²Lonza Biologics Plc, Cambridge, UK
- P-T-253 **Comparability of a High Throughput Parallel Purification System (HTPPS) to a Traditional Fast Purification Liquid Chromatography (FPLC) System for Downstream Process Development.** George Enriquez, Drew Keefe, Takeda, Lexington, MA, USA
- P-T-254 **Versatility of Automated Micropurifications using INTip Affinity, Desalting, and Ion Exchange for Early Process Screening.** P. Nikki Sitasuwan, Todd Mullis, Caleb Schlacter, John Tomashek, L. Andrew Lee, IMCS, Inc., Irmo, SC, USA
- P-T-255 **Innovative Gradient Substances: Influence of Co-and Counterions on Separation in Cation Exchange Chromatography.** Carolin Stange¹, Christoph Korpus², Romas Skudas², Christian Frech¹, ¹University of Applied Sciences Mannheim, Mannheim, GERMANY; ²Merck KGaA, Darmstadt, GERMANY
- P-T-256 **A Scalable Adenovirus Production Process, from Cell Culture to Purified Bulk.** Asa Hagner McWhirter, Magnus Bergman, Eva Blanck, Sara Haggblad-Sahlberg, Pelle Sjöholm, Maria Soultioti, Sravani Musunuri, Anna Akerblom, Asa Lagerlof, Mats Lundgren, GE Healthcare, Uppsala, SWEDEN
- P-T-257 **A Road Map to Licensure for Multicolumn Capture in a Mab Process.** Eric Gershenow¹, Bryan Pacada¹, Udara Dharmasiri¹, Eni Sterjanaj¹, Keen Chung¹, Deepika Vallabhaneni¹, Heather Mallory¹, Rachel Legmann¹, Marc Bisschops², Lilong Huang³, Tarek Abdel Gawad³, Joseph Rogalwicz³, Steven Miller³, Bradley Sepp³, Scott Battist³, ¹Pall Biotech, Westborough, MA, USA; ²Pall Biotech, Medemblik, NETHERLANDS; ³Emergent Biosolutions, Balitmore, MD, USA

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

AGILENT TECHNOLOGIES, INC.

2850 Centerville Road, Wilmington DE 19808, USA
800-227-9770

www.agilent.com

Agilent is a leader in life sciences, diagnostics and applied chemical markets. The company provides laboratories worldwide with instruments, services, consumables, applications and expertise, enabling customers to gain the insights they seek. Agilent's expertise and trusted collaboration give them the highest confidence in our solutions. Agilent focuses its expertise on six key markets, where we help our customers achieve their goals: food, environmental and forensics, pharmaceutical, diagnostics, chemical and energy, and research. Read about the Agilent products and solutions that serve these markets. Discuss your laboratory needs with an Agilent expert. For more information visit www.agilent.com.

ASAHI KASEI BIOPROCESS AMERICA, INC.

1855 Elmdale Avenue, Glenview, IL 60026, USA
847-556-9700

<http://www.ak-bio.com>

As a global partner to the biopharmaceutical industry, Asahi Kasei Bioprocess helps biologics manufacturers safely and efficiently produce medicines that patients can trust, by dependably supplying innovative yet exceptionally reliable bioprocess consumables, equipment and scientific support services. Our portfolio is anchored by Planova™ virus removal filters and features Cellufine™ chromatography media. These spherical cellulose beads exhibit high chemical stability, high mechanical strength, and possess inherent biocompatibility. Cellufine™ chromatography products are appropriate for all chromatographic techniques with Gel Filtration, Ion Exchange, Affinity, and Hydrophobic Interaction chromatography media available for preparation of a broad range of target molecules.

AVITIDE, INC.

16 Cavendish Ct., Lebanon, NH 03766, USA

<http://www.avitide.com>

Avitide discovers, manufactures and supplies affinity purification solutions to the biopharmaceutical industry. Avitide's 3-month affinity resin discovery-to-delivery service and proprietary ligand technology platform offers unparalleled speed, project success rate, and purification performance for any class of biopharmaceutical. Avitide is partnered with the majority of top-15 biopharma and top venture-backed biotechnology companies. Partnerships consist of facilitating rapid process development and analytics for speed to clinic, late-stage clinical and commercial life-cycle management projects, fully-continuous downstream processes, and purifying drug substances from closely related product contaminants. Avitide provides flexible arrangements for technology access, securing exclusive intellectual property, and resin supply to its partners.

BIO-RAD LABORATORIES, INC.

2000 Alfred Nobel Drive, Hercules, CA 94547, USA
800-424-6723

Bio-rad.com/proteinpurification

Bio-Rad Laboratories is a leading provider to the life science and clinical diagnostics markets where the company's products are used for scientific discovery, drug development, and biopharmaceutical production. Bio-Rad's long-lasting customer relationships foster the company's research and development efforts and inspire the introduction of innovative products and solutions that accelerate the discovery process and improve healthcare. The Protein Purification Business, part of the Life Science Group at Bio-Rad, provides researchers with the chromatography tools they need to isolate and purify proteins from laboratory scale through clinical trials into bioprocess manufacturing. With more than 60 years of purification experience, Bio-Rad continues to expand solutions to streamline the drug discovery and development process.

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

BIO-WORKS

Virdings Alle 18, SE-754 50 Uppsala, SWEDEN
46 8 56267 430

www.bio-works.com

Bio-Works is based in Uppsala, Sweden. We design, develop, manufacture and supply innovative leading edge agarose based chromatography products for purification and separation of peptides, proteins, oligonucleotides, viruses and other biomolecules. The use is for research, process development and manufacturing in Life Science, Biotech and Biopharma. Our resins are manufactured using a proprietary method and optimized for capacity, purity, productivity and reproducibility. The employees in the company have long experience from the biotechnology industry and deep knowledge about the development of high performance purification products. This has made it possible to develop a broad and efficient product portfolio.

DAISO FINE CHEM USA, INC.

3858 W. Carson St., Suite 126, Torrance CA 90503, USA
310-540-5312

<http://www.daisogelusa.com>

DAISO Fine Chem USA has supplied DAISOGEL™ bulk resins and PREP columns to pharmaceutical industry in North and South America. DAISOGEL™ made by Osaka Soda, Co., Ltd., in Japan has been used for PREP chromatography of small proteins, peptides, oligonucleotides and small molecules. DAISOGEL™ Reversed Phase resins are manufactured at GMP plant, filed DMF by FDA and most used worldwide. Additionally, two unique affinity chromatography resins are marketed by Osaka Soda using his patented Protein A.

EMP BIOTECH LLC

1001 Route 9 North, Suite 201, Howell, NJ 07731, USA
732-409-2600

<http://www.empbiotech.com>

emp Biotech LLC is a primary manufacturer and supplier of solid phases for downstream purification applications. With a portfolio of dextran and agarose functionalized solid phases, the company is a high-quality and affordable alternative to the industry's leading brand names. Furthermore, the company has developed the patent-pending SMART Chromatography™ technology to simplify downstream purification processes, reducing manufacturing costs and increasing recovery of valuable target protein. A linearly scalable technology, SMART Chromatography™ is the future of your purification. Our product ranges span from desalting/SEC through to immuno-affinity solid phases and at scales ranging from just a few millilitres to large-scale manufacturing volumes.

ESSENTIAL LIFE SOLUTIONS LTD.

308 Tosca Drive, Stoughton, MA 02072, USA
781-341-7240

www.essential-life.net

Essential Life Solutions is proud to offer a range of innovative products and services for scientists engaging in purifications. Our products range from 10mm id thru 50mm id (SNAP Columns), to our 7cm id thru 35cm id (EVOLVE Columns). We also offer column packing services and a wide range of column accessories. Please visit our booth to learn more!

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

GE HEALTHCARE

100 Results Way, Marlborough, MA 01752, USA
800-526-3593

www.gelifesciences.com

GE Healthcare Life Sciences provides a wide range of bioprocessing products and services that enable the development and manufacture of high-quality biotherapeutics and vaccines. Using our knowledge and expertise, we support our customers in increasing speed to market, while avoiding unnecessary costs and improving quality and performance in drug manufacturing. As a provider of high-quality products, customized technical and commercial services, as well as design and construction of complete biomanufacturing solutions, we support the biopharmaceutical industry in making health visions a reality.

JSR LIFE SCIENCES, LLC

1280 N. Mathilda Avenue, Sunnyvale, CA 94089, USA
408-543-8800

www.jsrlifesciences.com

JSR Life Sciences is focused on downstream bioprocessing materials and services including the manufacture and marketing of Amsphere™ A3, a protein A chromatography resin and the novel chromatography device platform, Chromassette. JSR operates a network of manufacturing facilities, sales offices and R&D labs in key markets throughout North America, Europe and Asia-Pacific. Leading edge biopharmaceutical Contract Development and Manufacturing Organization (CDMO) KBI Biopharma and Selexis SA, a global leader in mammalian cell-line generation technologies, are JSR Life Sciences companies.

KANEKA

7979 Gateway Blvd., Suite 220, Newark, CA 94560, USA
510-996-3559

www.bioseparation.kaneka.com

KANEKA is a well-established, 5-billion-dollar global chemical company. We are headquartered in Japan with subsidiaries in the United States, Belgium, Malaysia, China, Australia, Vietnam, India, South Korea and Taiwan. KANEKA has diverse business interests in pharmaceuticals, APIs, medical devices, and foodstuff products. KANEKA is also actively involved in the life sciences field and developed state of the art, high quality affinity chromatography resins branded as KanCap series. In addition, to address growing demands of bioprocessing community, KANEKA offers GMP biomanufacturing services via its subsidiary-Eurogentec; proteomics expertise via AnaSpec and Biologics related solutions through its subsidiary-GeneFrontier.

KNAUER WISSENSCHAFTLICHE GERÄTE GMBH

Hegauer Weg 38, 14163 Berlin, GERMANY
49-30 809727-0

www.knauer.net

We separate molecules and unite people. Based in Berlin, KNAUER has been serving the sciences since 1962. We develop and manufacture scientific instruments of superior quality for liquid chromatography systems and components, including: Analytical HPLC / UHPLC, Preparative HPLC, Fast protein Liquid Chromatography (FPLC), Multi-Column Chromatography / SMB, and Osmometry. With 135 employees, we are an established manufacturer of HPLC systems and components. Our valves, pumps, detectors, and other components are used for many separation processes outside of HPLC and are popular with customers who want custom solutions (OEM). We support technological advancement today and in the future.

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

LABOMATIC INSTRUMENTS AG

Ringstrasse 13, CH-4123 Basel, SWITZERLAND

41-61 485 80 00

www.labomatic.com

Labomatic Instruments AG is since more than 40 years a leader in the field of semi-preparative and preparative high-performance liquid chromatography offering standard and customized solutions in nearly all industrial segments including healthcare, environmental protection and sciences. Labomatic offers innovative chromatography products which include: binary, ternary and quaternary high- and low-pressure gradient meeting also GMP and ATEX specification; customized liquid handling systems with flexible dimensions, freely programmable for fully automated workflows; high-tech fluid and medical technology producing complex customer-specific assemblies for medical diagnostics instruments.

NOURYON / KROMASIL

281 Fields Lane Brewster NY 10509, USA

845-276-8223

www.kromasil.com

Kromasil® is the high performance chromatographic media from Nouryon, based on state-of-the-art spherical silica for UHPLC/HPLC/SFC analysis and purification using HPLC, SFC and SMB process technology. Kromasil materials have a unique combination of pore volume and surface area, together with very high mechanical and chemical stability. This gives unmatched qualities for efficient separation of substances from small molecules to peptides and proteins. Kromasil is available for NP, RP, SFC and chiral applications for the pharmaceutical, natural products, food, industrial and clinical markets.

NOVASEP

23 Creek Circle, Boothwyn, PA 19061, USA

610-494-0447

www.novasep.com

Novasep is a leading worldwide provider of integrated manufacturing solutions for the Life Science industries. We design and supply a unique range of purification systems for batch and continuous chromatography processes for the purification of both synthetic and bio-molecules. With FDA-inspected facilities around the world and a wide range of advanced technologies, Novasep also offers innovative solutions for your pharmaceuticals and biologics production.

POSTNOVA ANALYTICS

230 South 500 East Suite 110, Salt Lake City, UT 84102, USA

801-521-2004

www.postnova.com

Postnova Analytics offers the world-wide unique FFF-Platform, which is a range of different Field Flow Fractionation (FFF) and Light Scattering Systems (MALS) for advanced separation, fractionation and characterization of nanoparticles, proteins, polymers and bio macromolecules. Postnova offers a truly complete FFF-MALS product range, which is widely used for applications in Biopharmaceutical, Nanotechnology, Environmental, Food, Cosmetics and Polymer Science. The Postnova FFF-Platform can be also ideally coupled to Dynamic Light Scattering (Malvern Zetasizer Nano DLS) and Inductively Coupled Plasma - Mass Spec (Agilent Technologies ICP-MS), which provides high resolution size and molar mass separations as well as characterization and element speciation.

PUROLITE LIFE SCIENCES

Purolite Ltd., Unit D, Llantrisant Business Park, Llantrisant, Rhondda Cynon Taff, Wales, UK, CF72 8LF

44-1443229334

www.purolite.com/life-sciences

Purolite Life Sciences brings Purolite's innovative thinking and distinguished history of resin technology expertise to the global Life Sciences marketplace. Over three decades, Purolite has grown into the world's premier resin technology manufacturer and innovation leader, with production plants and advanced research labs across the globe.

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

REPLIGEN CORPORATION

41 Seyon Street, Building 1 Suite 100, Waltham, MA 02453, USA
781-419-1800

www.repligen.com

Inspiring advances in bioprocessing, Repligen is a technology leader in bioprocess filtration, pre-packed chromatography and Protein A ligands development. Propelled by a culture of innovation and collaboration, and with a focus on cost and process efficiencies, our people and our technologies help meet critical bioproduction demands worldwide. Named one of the fastest growing biotech companies in the USA, Repligen is headquartered in Boston, Massachusetts with major manufacturing sites in Massachusetts, California, Sweden, and Germany.

SEPAX TECHNOLOGIES, INC.

5 Innovation Way, Delaware Technology Park, Newark, DE 19711, USA
877-SEPAX-US

www.sepax-tech.com

Founded in 2002, Sepax Technologies is a Delaware US-based leading liquid chromatography (LC) products and services provider. We specialize in the development and manufacture of LC analytical, preparative and process separation/purification columns, bulk resins and systems in a wide range of modalities, such as SEC, IEX, HIC, Affinity and RP. We also provide LC services including analytical testing, method optimization, purification, custom resin development and ligand immobilization. Certified to the ISO 9001-2015 standards, Sepax focuses on customer/market needs and is expanding its presence and supply chain around the globe in three business platforms: Analytical Chromatography, Industrial Purification and Medical Diagnostics.

SEPIATEC GMBH

19145 Parthenia Street, Suite C, Northridge, CA 91324, USA
714-379-8900

www.zinsserna.com

Sepiatec GmbH develops separation systems based on HPLC (High Performance Liquid Chromatography) and SFC (Supercritical Fluid Chromatography) technology, enabling our customers to speed up their separation and method development significantly. Sepiatec systems are used around the world by major pharmaceutical and biotechnology companies as well as by research institutes.

SERVIER CDMO

50 rue Carnot, 92284 Suresnes, FRANCE
33-677615390

www.servier-cdmo.com

Servier is the largest private French pharmaceutical company that has commercialized more than 50 molecules over the last 60 years. The business unit "Servier CDMO", with a network of 11 facilities worldwide, was created to bring this expertise to the companies looking for quality, reliability and flexibility in their projects. We cover all the phases from the clinical supply to the manufacturing for drug substance and drug product.

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

SHIMADZU Scientific Instruments

7102 Riverwood Drive, Columbia, MD 21046, USA

800-477-1227

<http://www.ssi.shimadzu.com>

Shimadzu is the leading provider of analytical instrumentation, from AA, ICP-MS, GC, and FTIR to UHPLC, PREP LC, LC-MS/MS, GC-MS/MS, and UV-Vis, for applications in a variety of industries. Our extensive portfolio of high-quality platforms provides customers with unparalleled solutions-based offerings and we encourage results-driven collaborations that address evolving requirements.

SP SCIENTIFIC

935 Mearns Road, Warminster, PA 18974, USA

800-523-2327 / 215-672-7800

<http://www.spscientific.com>

SP Scientific is a leading manufacturer of specialty equipment for pharmaceutical, biotechnology and industry. Genevac is a subsidiary of SP Scientific with leading edge centrifugal evaporation systems to eliminate solvent drying bottlenecks in drug discovery and synthetic chemistry laboratories. Systems are designed for use in medicinal chemistry, parallel synthesis, purification, natural products, metabolism, genomics/proteomics, screening and storage applications; ranging from bench-top sized EZ-2 to HT Series 3 for high throughput scale-drying. Patented technology, engineering innovation and understanding needs of chemists working in this field drive Genevac to produce world-leading sample concentrators capable of removing even the most difficult solvent mixtures without compromising sample purity or integrity.

SUZHOU NANOMICRO TECHNOLOGY CO., LTD.

2 Baichuan Street, Suzhou Industrial Park, Jiangsu 215123, CHINA

86-0512-6295 6000

<http://en.nanomicrotech.com/>

Suzhou NanoMicro Technology Company is a world-leading technology company for the production of nano- and microspheres with striking uniformity, controlled porosity, and functional surface chemistry. Our state-of-art manufacturing facilities are well positioned to produce processing quantity of chromatography resins such as reversed/normal phases, ion exchange, affinity and Protein A, hydrophobic interaction, chiral separation, SPE, etc. Our resins are silica or polymer based, and have found their applications in preparative and analytical separation processes for both large biologics and small molecules. Our reach is global with customers and collaborators spanning from Asia to Europe and USA. Visit us at the booth!

THERMO FISHER SCIENTIFIC

35 Wiggins Avenue, Bedford, MA 01730, USA

800-955-6288

<https://www.thermofisher.com/us/en/home/life-science/bioproduction/poros-chromatography-resin.html>

Thermo Fisher Scientific supplies innovative solutions for the world's pharmaceutical and biopharmaceutical industries. With applications that span the drug development process – from drug discovery through large-scale commercial production - we provide a broad range of products and services for cell culture, purification and analytics. POROS® and CaptureSelect™ chromatography resins offer high performance polish and unprecedented affinity chromatography solutions.

Exhibiting Companies at the Forefront of Preparative and Process Chromatography

WYATT TECHNOLOGY CORPORATION

6330 Hollister Ave., Santa Barbara, CA 93117, USA

805-681-9009

www.wyatt.com

Wyatt Technology is the recognized leader in light scattering instrumentation for characterizing macromolecules and nanoparticles in solution. Wyatt's products determine absolute molar mass, size, charge, interaction properties, conformation and conjugation. The company offers a complete suite of multi-angle light scattering (MALS) instruments, field-flow fractionation (FFF) systems, dynamic light scattering (DLS) and zeta potential instruments and detectors to measure refractive index and intrinsic viscosity.

YMC AMERICA, INC.

941 Marcon Blvd., Suite 201, Allentown, PA 18109, USA

610-266-8650

www.ymcamerica.com

YMC America, Inc. is the exclusive sales and support channel for separations leader YMC Co., Ltd., whose products include stationary phase chemistries primarily used for high and low pressure separation science. Products bonded to spherical silica, hybrid-silica, and polymer-based particles from 1.9 to 150 μm are available in packed columns or bulk chemical packaging formats. YMC America maintains offices, application support laboratories, a warehouse, and sub-distribution of YMC products throughout the western hemisphere, either through direct contact with its customers or via a network of distributors throughout the Americas. YMC products are available on a world-wide basis.

Volunteer Recognition

Andreas Alberti, University of Virginia
 Martina Catani, University of Ferrara
 Sevda Deldari, University of Maryland, Baltimore County
 Chiara De Luca, University of Ferrara
 Preston Fuks, University of Virginia
 Lucas Kimerer, University of Virginia
 Yang Liu, University of Maryland, Baltimore County
 Payam Rezaei, University of Maryland, Baltimore County
 Joey Roberts, University of Virginia
 Calef Sanchez Trasviña, University of Virginia
 Ursula Simon, University of Edinburgh
 Siddharth Parasnavis, Rensselaer Polytechnic Institute
 Sebastian Vogg, ETH Zurich
 Yiran Wang, University of Virginia

PREP Symposium Conference History

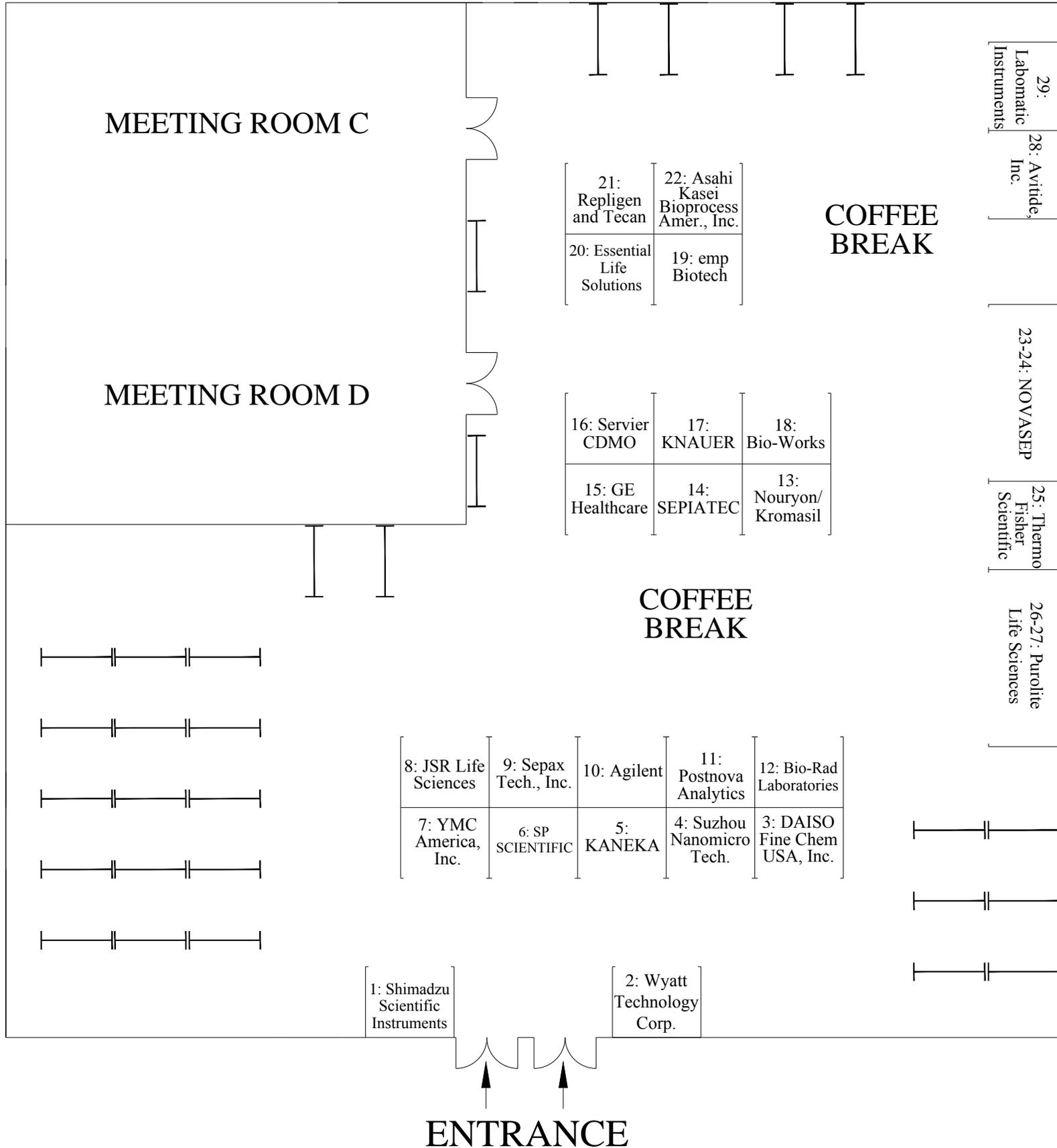
1985	Washington DC	2004	Baltimore, MD
1986	Washington DC	2005	Philadelphia, PA
1987	Washington DC	2006	Baltimore, MD
1989	Washington DC	2007	Baltimore, MD
1991	Washington DC	2008	San Jose, CA
1993	Washington DC	2009	Philadelphia, PA
1994	Washington DC	2010	Philadelphia, PA
1995	Washington DC	2011	Cambridge, MA
1996	Washington DC	2012	Cambridge, MA
1997	Washington DC	2013	Boston, MA
1998	Washington DC	2014	Boston, MA
1999	San Francisco, CA	2015	Philadelphia, PA
2000	Washington DC	2016	Philadelphia, PA
2001	Washington DC	2017	Philadelphia, PA
2002	Washington DC	2018	Baltimore, MD
2003	San Francisco, CA	2019	Baltimore, MD

PREP SYMPOSIUM 2019

HYATT REGENCY

BALTIMORE INNER HARBOR

BALTIMORE, MD



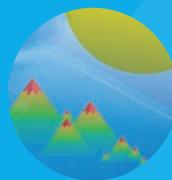
the **Analytical Scientist**[™]

Creating rich content for communities
across the whole analytical spectrum
– from environmental testing to the
-omics to pharma to food and beyond.

REGISTER NOW AT

theanalyticalscientist.com/register

It's quick and completely free



CHROMATOGRAPHY TODAY

ONLINE and in **PRINT**, **CHROMATOGRAPHY TODAY** is read by qualified professionals involved in Separation Science.

Featuring in depth articles exploring the latest techniques within chromatography as well as industry news, product launches, case studies, training courses and exhibition updates.

For prices on advertising or to request a copy, please contact: sales@intlabbmate.com

www.chromatographytoday.com

OVER 30,000
READERS

International **LABMATE**

A MULTI-CHANNEL AUDIENCE FOR MANUFACTURERS & SUPPLIERS TARGETING THE LABORATORY INDUSTRY ACROSS EUROPE & THE MIDDLE EAST

Market leading journals keeping you informed of all the latest products, technical articles and news. All available in print, online and now via our mobile app.

For prices on advertising or to request a copy, please contact: sales@intlabbmate.com

www.labmate-online.com

OVER 60,000
READERS



Printed Journals

Technical Articles, Industry News, New Products and Show Reviews.



e-Bulletins

New products and Industry News directly to your inbox.



Website

Journal content plus directories, videos and e-learning.



e-Journals

The publication available to read on your laptop or mobile device.



ANALYTICAL TRAINING SOLUTIONS

Premier Training for Analytical Scientists

By way of a thank you, to you as a delegate at *PREP 2019* we are pleased to confirm a unique learning and resource initiative, put together especially for your laboratory.

In collaboration with thought leaders; Dr John Dolan, Tom Jupille, Dr Matthew Klee and Dr Cari Sanger, we are offering a **SPECIAL 25% DISCOUNT RATE*** for access to all of our leading HPLC, LC-MS, GC, GC-MS and CE learning modules, covering everything from 'Fundamentals' to 'Advanced Method Development'.

*Note that this offer is only valid until 31 July, 2019 so register for your chosen courses soon to take advantage. Courses include...

-  The Fundamentals of HPLC
-  HPLC & UHPLC Troubleshooting
-  Advanced HPLC Method Development
-  Principles of HPLC Validation
-  Practical HPLC for Biopharmaceuticals
-  LC-MS/MS for Chromatographers
-  Introduction to GC
-  Intermediate GC
-  GC-MS for Operators and Method Developers
-  Introduction to CE

Don't miss out on this exceptional learning opportunity and register today! To receive your discount visit www.analytical-training-solutions.com and use the voucher code **PREP2019** when purchasing the course to activate your discount.

www.analytical-training-solutions.com



LC | GC

The #1 Global Information Source for Chromatographers



Subscribe for FREE today
ChromatographyOnline.com