

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

PREP 2019

32nd International Symposium on Preparative and Process Chromatography

—PREP 2019 Preliminary Scientific Program—

[Click Here to Submit Poster Abstracts](#)

(program as of 4/10/2019)

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 Mihlbachler, 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

The use of still or video cameras and cell phones is prohibited during the oral program; and prohibited in the poster and exhibition areas without the express consent of the presenter or exhibitor. Opinions expressed by presenters, instructors and exhibitors are not necessarily the opinions of the PREP 2019 Symposium. 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 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.

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: TBA

[Must pre-register/pay to attend at PREPsymposium.org](http://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: TBA

[Must pre-register/pay to attend at PREPsymposium.org](http://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: TBA

[Must pre-register/pay to attend at PREPsymposium.org](http://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: TBA

[Must pre-register/pay to attend at PREPsymposium.org](http://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.

Free Vendor Workshops

Monday, July 8, 2019

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

- 12:30-2:00 pm **Drivers and Visions for Future Antibody Capture Platforms Including Bispecific and Antibody Variants**
Sponsored by GE Healthcare Life Sciences
Must pre-register at the booth of GE Healthcare Life Sciences by Monday @ 10:50 AM
- 12:30-2:00 pm **Addressing Purification Challenges with New Technologies**
Sponsored by Bio-Rad Laboratories
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**
Sponsored by Knauer
Must pre-register at the booth of Knauer by Monday @ 10:50 AM
- 12:30-2:00 pm **Affinity Chromatography Media useful for Suppression of Aggregate Formation**
Sponsored by DAISO Fine Chem USA, Inc.
Must pre-register at the booth of DAISO Fine Chem USA, Inc. by Monday @ 10:50 AM

Free Vendor Workshops

Tuesday, July 9, 2019

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

- 7:00-8:25 am **TBA**
Sponsored by Thermo Fisher Scientific
Must pre-register at the booth of Thermo Fisher Scientific by Monday @ 10:50 AM
- 12:30-2:00 pm **Manufacturing Innovation: A Complete Chromatography Resin Portfolio for Reverse-Phase, Ion Exchange and Protein A Affinity Separations**
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**
Sponsored by Nouryon/Kromasil
Must pre-register at the booth of Nouryon/Kromasil by Tuesday @ 10:40 AM
- 12:30-2:00 pm **Innovative Technologies for PREP Workflows**
Sponsored by Agilent
Must pre-register at the booth of Agilent by Tuesday @ 10:40 AM
- 12:30-2:00 pm **Industrial Purification Solutions with Innovative Process Technology**
Sponsored by Novasep
Must pre-register at the booth of Novasep by Tuesday @ 10:40 AM

Poster Competition

Poster presentations are a very important component of the PREP Symposia. In order to acknowledge their contribution to the field and high standards of the symposium, awards will be offered to distinguish the best poster contributions at PREP 2019. Posters will be evaluated on the basis of scientific content, clarity of presentation, and layout. Posters co-authored by members of the Scientific and Industrial Advisory Committees or by judges are eligible only if the main author and presenter of the poster is not a member on the above committees. Posters authored or co-authored by members of the Organizing Committee or judges are not eligible for Best Poster Awards. However, should these posters be considered of sufficient quality to be among the top prize-winning entries, they will be given an Honorable Mention. 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 at the Symposium Registration Desk before 11:00 a.m. on Tuesday, July 9.

Presentation of awards to winners of the Best Poster Competition will take place at 10:10 a.m. on Wednesday before the mid-morning break. The winners are encouraged to be present, but it is not mandatory to be present to win.

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

Preliminary List of Sponsors, Exhibitors, Media Partners

Agilent Technologies	Knauer
Analytical Scientist	LabBulletin
BioProcessing Journal	LCGC
Bio-Rad Laboratories (Bronze sponsor)	Nouryon/Kromasil (Silver sponsor)
Bio-Works	Novasep
Chromatography Today	Postnova Analytics
DAISO Fine Chem US	Purolite Life Sciences (Gold sponsor)
emp Biotech	Separation Science
Essential Life Solutions	Sepiatec
GE Healthcare Life Sciences (Gold sponsor)	Servier CDMO
Genetic Engineering and Biotech. News	Shimadzu Scientific Instruments
Interchim	Thermo Fisher Scientific
International Labmate	Wyatt Technology
JSR Life Sciences	YMC America (Bronze sponsor)
Kaneka	

PRELIMINARY LIST OF CORPORATE SPONSORS



Sunday, July 7, 2019

- 9:00 AM - 1:00 PM **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 **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 **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 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 Future Antibody Capture Platforms Including Bispecific and Antibody Variants**
Sponsored by GE Healthcare Life Sciences
Must pre-register at the booth of GE Healthcare Life Sciences by Monday @ 10:50 AM
- 12:30-2:00 PM **Addressing Purification Challenges with New Technologies**
Sponsored by Bio-Rad Laboratories
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**
Sponsored by Knauer
Must pre-register at the booth of Knauer by Monday @ 10:50 AM
- 12:30-2:00 PM **Affinity Chromatography Media useful for Suppression of Aggregate Formation**
Sponsored by DAISO Fine Chem USA, Inc.
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: TBA

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: TBA

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) **Cost Effective Peptide Purification via ZEOsphere DRP Mixed-mode Chromatography.** Jürgen Machielse¹, Andrea Wild¹, Timo Nuijens², Marcel Schmidt², ¹Zeochem AG, Rüti, SWITZERLAND; ²EnzyPep, Geleen, NETHERLANDS
- 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: TBA

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: TBA

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**
See details and pricing at PREPsymposium.org. Open to conference and non-conference participants. Must pre-register to attend.

Tuesday Free Vendor Workshops

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

7:00 AM - 8:25 AM **TBA**
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) **Advanced Merck High Throughput Purification Capabilities Supporting HTE Microscale Purification.** Kuanchang Chen, Min Liu, Tao Meng, Discovery Chemistry, Kenilworth, NJ, USA

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:

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 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**
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**
Sponsored by Nouryon/Kromasil
Must pre-register at the booth of Nouryon/Kromasil by Tuesday @ 10:40 AM
- 12:30-2:00 PM **Innovative Technologies for PREP Workflows**
Sponsored by Agilent
Must pre-register at the booth of Agilent by Tuesday @ 10:40 AM
- 12:30-2:00 PM **Industrial Purification Solutions with Innovative Process Technology**
Sponsored by Novasep
Must pre-register at the booth of Novasep by Tuesday @ 10:40 AM

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**

Tuesday, July 9, 2019

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

Session Chair: TBA

Location: Constellation Ballroom C, 2nd floor

- 3:10 PM (L-211) **QbD: Light on a Chromatography Blind Spot.** Gunnar Malmquist, Peter Hagwall, 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.** Ashish Sharma, Balakumar Thangaraj, Amgen Inc., Cambridge, MA, USA
- 4:50 PM - 5:00 PM **Intermission**

7B. Tuesday Parallel Session: Stationary Phases - III

Session Chair: TBA

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
- 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 Elch, Herb Lutz, MilliporeSigma, Burlington, MA, USA
- 4:50 PM - 5:00 PM **Intermission**

Tuesday, July 9, 2019

8A. Tuesday Parallel Session: Alternative Chromatographic Processes

Session Chair: TBA

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

8B. Tuesday Parallel Session: Continuous Processes

Session Chair: TBA

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, Budapest University of Technology and Economics & RotaChrom Technologies LLC, Budapest & 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) **Water based Purification Process for Steviol Glycosides using Orochem's Simulated Moving Bed Chromatography.** Anil Oroskar, Babu Antharavally, Rahuljit Pal, Jeff Burgard, Orochem Technologies Inc., Naperville, IL, USA
- 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) **Mechanistic Modeling for the Design and Optimization of Reverse-phase Preparative Chromatography of Synthetic Peptides.** Christopher Polster, Eli Lilly and Company, Indianapolis, IN, USA

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 Chair: TBA

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: TBA

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 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
- 5:10 PM (L-319) **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
- 5:30 PM (L-320) **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
- 5:50-6:00 PM **CLOSING REMARKS**, Giorgio Carta, University of Virginia, Charlottesville, VA, USA
- 6:15 PM - 7:15 PM **FAREWELL MIXER**
PREP & ISPPP shared Mixer in ISPPP Exhibit/Poster Hall
Location: Constellation Ballroom E/F, 2nd floor

PREP 2019 Preliminary List of Poster Presentations

Poster Board size 42 inches high by 42 inches wide (107cm x 107cm)

See link to 'Poster Guidelines' under Posters at PREPsymposium.org

Submit abstracts online at PREPsymposium.org

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

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

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, Baltimore, MD, USA

PREP 2019 Preliminary List of Poster Presentations

Poster Board size 42 inches high by 42 inches wide (107cm x 107cm)

See link to 'Poster Guidelines' under Posters at PREPsymposium.org

Submit abstracts online at PREPsymposium.org

Increased Productivity with Single-use Membrane Chromatography. [Daniela Soluk](#)¹, Ricarda Busse²,
¹Sartorius Stedim Biotech, Bohemia, NY, USA; ²Sartorius Stedim Biotech, Gottingen, GERMANY

Penetrating and Non-penetrating Tracer for the Empiric Determination of Column Porosities used in Chromatography Modelling – A Long and Winding Road. Catherine MUschen, Ronald Jäpel, [Johannes Buyel](#), Fraunhofer IME, Aachen, GERMANY

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

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

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

A New Chromatographic Approach to Analyze Methylproteome with Enhanced Lysine Methylation Identification Performance. [Mingliang Ye](#), Dalian Institute of Chemical Physics CAS China, Dalian, CHINA

Developing Intelligent High-pressure Pumps with a Wide Operation Range for Next Generation of Process Chromatography Applications. [Hans-Joachim Johl](#), Waldemar Horn, LEWA, Leonberg, GERMANY

Pesticide Classification System in the Isolation of Cannabidiol using Centrifugal Partition Chromatography. Arpad Konczol¹, Dora Rutterschmid¹, [Robert Orkenyi](#)^{1,2}, ¹RotaChrom Technologies LLC., Dabas, HUNGARY; ²Budapest University of Technology and Economics, Budapest, HUNGARY

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

Error Modeling in Chromatography and Parameter Confidence. [William Heymann](#), Eric von Lieres
Forschungszentrum Julich, Julich, GERMANY

Purification of Infectious Adenovirus using Ceramic Hydroxyapatite Column. [Yae Kurosawa](#), HOYA Technosurgical Corporation, Tokyo, JAPAN

The Impact of Pore Size and Selectivity for Reversed Phase Purification of Insulin. [Priya Jayaraman](#)¹, Sami Chanaa¹, Andrew Coffey², ¹Agilent Technologies, Wilmington, DE, USA; ²Agilent Technologies, Church Stretton, UK

Rapid Sanitization of Protein A Resin in Bioprocess Columns using a Sporicidal Agent. [Johan Avallin](#)¹, Anders Nilsson¹, Henrik Ingvarsson¹, Anna Gronberg¹, Magnus Asplund¹, Eva Blanck¹, Linda Persson¹, [Reinhard Braaz](#)², Joseph Vinnemeier², Philip Lester², ¹GE Healthcare, Uppsala, SWEDEN; ²Roche, Penzberg, GERMANY

PREP 2019 Preliminary List of Poster Presentations

Poster Board size 42 inches high by 42 inches wide (107cm x 107cm)

See link to 'Poster Guidelines' under Posters at PREPsymposium.org

Submit abstracts online at PREPsymposium.org

Reduce Risk of Failure in Virus Clearance Studies using Robust Scale-down Chromatography Tools. [Linnea Troeng](#), GE Healthcare, Uppsala, SWEDEN

Continuous Capture Chromatography as an Integrated Downstream Purification Platform for mAbs. Jared Steffy¹, Lindsay Arnold¹, [Kathleen Mihlbachler](#)², ¹MedImmune, Gaithersburg, MD, USA; ²YMC Process Technologies, Devens, MA, USA

Isolation of Pharmaceutical Degradants using Supercritical Fluid Chromatography (SFC). [Paul Lefebvre](#), Alexander Neue, Cindy Berger, Heather Lane, Averca Discovery Services, Marlborough, MA, USA

Rapid Resolution of Isomers from Chiral Molecules with Multiple Stereocenters. [Paul Lefebvre](#), Alexander Neue, Cindy Berger, Heather Lane, Averca Discovery Services, Marlborough, MA, USA

Inexiotech Disruptive Process in Preparative Chromatography. Application to a Case Study. [Nicolas Fauquet](#)¹, Olivier Monasson², Alexandre Maciuk³, Frederic Cheviron¹, ¹Inexios, Montmagny, FRANCE; ²Cergy Pontoise, FRANCE; ³Chatenay-Malabry, FRANCE

New Unconventional High Capacity Affinity Matrix for Antibody Purification. [Yasmin Kaveh Baghbaderani](#), Sebastian P. Schwaminger, Paula Fraga Garcia, Sonja Berensmeier, Technical University of Munich, Garching, GERMANY

Characterization of Tryptamine-coupled Resin for Affinity Purification of Human IgG. [H. Michelle Rakotondravao](#)¹, Ayaka Ohara¹, Naohiro Kuriyama², Noritaka Kuroda², Masatoshi Taniguchi², Yumiko Sakoda², Jun-Ichi Horiuchi¹, Yoichi Kumada¹, ¹Kyoto Institute of Technology, Kyoto, JAPAN; ²YMC, Kyoto, JAPAN

Semi-prep FcR Column for Separation of Monoclonal Antibody based on the Differences of N-glycans. [Ryoko Otake](#), Yosuke Terao, Tosoh Corporation, Ayase, JAPAN

Protein A Chromatography as a Polishing Step in a Downstream Bioprocess? [Ehsan Espah Borujeni](#), William Rayfield, Sandra Rios, Merck Co. & Inc., Kenilworth, NJ, USA

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 Jenco](#)⁴, ¹GE Healthcare, Stevenage, UK; ²GE Healthcare, Uppsala, SWEDEN; ³GE Healthcare, Little Chalfont, UK; ⁴GE Healthcare, Marlborough, MA, USA

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 Antos](#)¹, ¹Rzeszow University of Technology, Rzeszow, POLAND; ²Austrian Centre of Industrial Biotechnology, Vienna, AUSTRIA; ³Department of Biotechnology, Vienna, AUSTRIA

Influenza Virus Capture using Membrane Chromatography: Improving Selectivity by Matrix Design and Pseudo-affinity Ligand Interactions. [Florian Taft](#)¹, Ana Raquel Fortuna¹, Michael Wolff², Udo Reichl³, 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

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

PREP 2019 Preliminary List of Poster Presentations

Poster Board size 42 inches high by 42 inches wide (107cm x 107cm)

See link to 'Poster Guidelines' under Posters at PREPsymposium.org

Submit abstracts online at PREPsymposium.org

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

Molecularly Imprinted Polymer Solid Phase Extraction for Analysis of Polycyclic Aromatic Hydrocarbons in Urban Road Dust. Abdulummeen Abdulkadir, University of KwaZulu_Natal, Durban, SOUTH AFRICA

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

Practical Integration of a Model based Approach to Small Molecule API/Intermediate Process Chromatography within the Pharmaceutical Manufacturing Operations of Johnson Matthey's Health Business Division. Paul O'Shaughnessy, Johnson Matthey Health, Reading, UK

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

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

Strategies for Process Design: Unlocking Combinations with Continuous Chromatography and Cutting-edge Technologies. Ben Kester, Joseph Pate, Kate Blando, Catalent, Bloomington, IN, USA

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

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

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

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

Recombinant Monoclonal Antibody – Rituximab Biosimilar – Alternate Non-affinity based Chromatographic Purification Process. Anton Posch¹, Chelsea Pratt², Laura Moriarty², Payal Khandelwal², ¹Bio-Rad Laboratories, Munich, GERMANY; ²Bio-Rad Laboratories, Hercules, CA, USA

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

PREP 2019 Preliminary List of Poster Presentations

Poster Board size 42 inches high by 42 inches wide (107cm x 107cm)

See link to 'Poster Guidelines' under Posters at PREPsymposium.org

Submit abstracts online at PREPsymposium.org

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

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

Impact of Plant Cultivation on the Chromatographic Behavior of Host Cell Proteins Purified from Different Nicotiana Species. [Jan Wilhelm Huebbers](#)¹, 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

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

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