8th IABS Statistics Workshop

Advancing CMC Statistics for a New Generation of Statisticians, Regulatory Reviewers, Scientists, and Modelers

November 7-10, 2022
Virtual Meeting

The application of statistics in Chemistry, Manufacturing & Control (CMC) to advance the development and commercialization of important medical products has tremendous impact. New statistical methods and digital and computing technologies are continuously emerging and must often be adapted to add value in the CMC context. Successful practitioners of CMC statistics come from a range of original disciplines, including formal training in statistics, mathematics, and many branches of science and engineering. This conference provides a forum for discussing recent advances and opportunities including Bayesian methods, artificial intelligence & machine learning, and deeper collaboration between clinical & CMC statisticians.

As biologicals move more quickly from discovery to clinical testing, CMC has landed squarely on the critical path for development. Modernization of the Quality framework from traditional Quality-by-Testing to Quality-by-Design elevates the importance of innovation for statistical methods in CMC. The 2022 IABS Statistics Workshop focuses on the future, providing an opportunity for regulatory reviewers to consider new methods in advance of specific product submissions. The sessions will cover a balance of new statistical methods, applications of statistical methods to new modalities, career pathways in CMC Statistics, and evolving updates to regulatory guidance. Case studies remain a highlight of this workshop and will tie together regulatory advances with adoption of new methods.

Scientific / Organizing Committee

Julia **O'NEILL**, Co-Chair, Moderna
Stan **ALTAN**, Janssen
Timo **BAILER**, Boehringer-Ingelheim
Rick **BURDICK**, Burdick Consulting
Cristiana **CAMPA**, GSK
Catherine **CHENG**, Novartis Gene Therapies
JoAnn **COLEMAN**, Spark Therapeutics
Jun **GAO**, Health Canada
Katherine **GIACOLETTI**, Merck
Theo **KOULIS**, Genentech

Kristi **GRIFFITHS**, Co-Chair, Eli Lilly and Co.
Ruojia **LI,** Bristol-Myers Squibb
Jia **LIU,** Pfizer
Chuck **MILLER**, Merck
Guillermo **MIRO-QUESADA,** AstraZeneca
John **OLEYNICK**, Janssen
Laura **PACK,** Rezolute, Inc.
José **RAMIREZ,** Kite
Tim **SCHOFIELD**, IABS, CMC Sciences, LLC

DAY 1 – MONDAY, NOVEMBER 7, 2022

10:00am*   **Introduction to the meeting and IABS**
Tim SCHOFIELD, IABS

10:10am   **Introduce Keynote Speaker**
Cristiana CAMPA, GSK

10:15am   **Keynote Address**
Bridging Studies for Setting Correlate of Protection for Vaccines
Valentina BERNASCONI, Head of Laboratory Science, CEPI

Session I	*Applications of CMC Statistics to New Modalities*

New modalities, such as gene therapy, are a growing field in which CMC statisticians are making an impact. These modalities present many new and challenging problems for statisticians. The diseases are often rare, the sample sizes can be very small, and regulatory guidance and interactions are still in the early stages.

Case studies in this session will be presented by seasoned statisticians who have taken previous experience in traditional modalities and retrofit or applied new methodology to new modalities and will offer their insights into what opportunities exist to overcome some of the challenges mentioned.

Chairpersons: **JoAnn COLEMAN**, Spark Therapeutics; **José RAMIREZ**, Kite, A Gilead Company

11:10am   **Session Introduction**
JoAnn COLEMAN, Spark Therapeutics

11:15am   Statistical Approaches for CMC Comparability Testing for Gene and Cell Therapy
Richard K. BURDICK, Burdick Statistical Consulting

11:45am   **Break**

12:00pm   Bayesian Modeling to Demonstrate Comparability in a Novel, Clinical-Stage Bioreactor System for Manufacturing Tissue-Engineered Human Acellular Blood Vessels
John MCMAHON, Humacyte Global, Inc.; **Katherine GIACOLETTI**, Merck

12:30pm   Minimum Viabilities: A Lower Bound Tale
José RAMIREZ, Kite, A Gilead Company

1:00pm   **Panel Discussion**
Facilitator: JoAnn COLEMAN, Spark Therapeutics
Panelists: Valentina BERNASCONI; Rick BURDICK; José RAMIREZ;
John McMAHON and Katherine GIACOLETTI

2:00pm   **Parallel Breakout Sessions**
#1 – Teaching People to Fish, **Theo KOULIS**, Genentech
#2 – Advances in Data Science, **Ruojia LI**, Bristol-Myers Squibb

2:40pm   **Review Day 1 and preview Day 2 agenda**
* Times are Eastern Standard Time

DAY 2 – TUESDAY, NOVEMBER 8, 2022

Session II	*Quantitative Sciences in CMC*

This session will bring together CMC statisticians and data scientists to discuss their career paths, how they work within and across their organizations, and visions for future powerful collaborations. People at different stages in their career will describe how they came to be statisticians / data scientists in the CMC space and what it looks like to perform these roles within their organizations. Industry leaders will showcase how they bring statisticians and data scientists together and partner with other functions to elevate CMC by connecting data, automating analysis and reporting, implementing advanced modeling, and further establishing Quality by Design approaches. Together, these speakers will highlight how a career in CMC Statistics and data science can be an exciting choice for early professionals and will excite professionals at any stage in their career for the countless possibilities that lie ahead.

Talks will be followed by a panel discussion with all speakers where CMC professionals experienced with statistical design, data analyses, modeling and digitalization will discuss their career paths and answer virtual audience questions about continuing education and/or changing career tracks after beginning a career in the pharma industry. We will talk about how statisticians can partner with data scientists to elevate efforts within CMC organizations. Panelists represent professional statisticians, data scientists and scientists who have become statistical and data science SMEs and changed career tracks from science to data-focus, scientists who have developed their statistical / data science expertise to continue in their current career track, and statisticians / data scientists who learned about the CMC principal sciences (e.g., chemistry, engineering, regulatory) after joining a pharma company.

Chairpersons: Laura PACK, Rezolute, Inc.; **Ruojia LI**, Bristol-Myers Squibb

10:00am   **Session Introduction**
Laura PACK, Rezolute, Inc.

10:05am   **Session Kick-Off**
Siân RATCLIFFE, Biogen

10:20am   **Mini Talks: "Day in the Life," "My Career Journey," & "How CMC Stats and Data Science Work Together"**
- **Brandye SMITH-GOETTLER**, Merck
- **Tara SCHERDER**, SynoloStats
- **Jonathan ROSS**, Rezolute, Inc
- **Jeff GARDNER**, DataPharm Statistical & Data Management
- **Sara BYERS**, Bristol-Myers Squibb
- **Sangwook CHOI**, Bristol-Myers Squibb

12:00pm   **Break**

12:30pm   **Panel Discussion (all speakers)**

1:45pm   **Review Day 2 and preview Day 3 agenda**
Ruojia LI, Bristol-Myers Squibb

DAY 3 – WEDNESDAY, NOVEMBER 9, 2022

| Session III | *Regulatory (Opportunities) Advances in CMC Statistics* |

The focus of this session is an update on the regulatory framework for CMC Statistics, with emphasis on forward-looking topics and principles such as new or revised ICH Guidelines, as well as recent EMA and FDA guidelines on topics like acceleration and Bayesian Statistics. In particular, the session will provide perspectives on upcoming revisions of the ICH Guidelines on Specifications and Stability, insights on statistical thinking around ICH Q14 and the Analytical Target Profile, reflection on continuous processing and implementation of ICH Q13, and an update on Bayesian opportunities from the CMC Bayesian Scientific Working Group. Speakers from Regulatory agencies and Industry will offer a diverse set of insights and will engage in a lively panel discussion at the end of the session.

Chairpersons: **Cristiana CAMPA**, GSK, **Jun GAO**, Health Canada

10:00am	**Session Introduction** **Jun GAO**, Health Canada
10:05am	Establishing Specifications and Shelf Lives- Where Are We and Where Do We Go? **Mats WELIN**, Medical Products Agency, Sweden
10:35am	Total Error in Bioassay – A Unified Evaluation of Assay Performance **Ann YELLOWLEES, Quantics**
11:05am	**Break**
11:20am	**Parallel Breakout Sessions** #1 – Patient Centric Specifications, **Julia O'NEILL**, Moderna #2 – Assay Validation Guidelines, **Tim SCHOFIELD**, CMC Sciences
12:20pm	Continuous Processing for Vaccines - A Study Case for Continuous Microfluidic AS01 Production **Laurent STRODIOT**, GSK
12:50pm	Progress and Opportunities: An Update From The CMC Bayesian Scientific Working Group **Paul FAYA,** Eli Lilly and Company
1:20pm	**Panel Discussion** **Facilitator: Cristiana CAMPA,** GSK **Panelists: Mats WELIN**; **Laurent STRODIOT**; **Ann YELLOWLEES**; **Paul FAYA**; **Jun GAO**
2:20pm	**Review Day 3 and preview Day 4 agenda**

DAY 4 – THURSDAY, NOVEMBER 10, 2022

Session IV	*Application of New CMC Statistics Methodologies*

The application of CMC Statistics and the respective requirements that come with it are constantly evolving over time. Therefore, new methodologies are developed to face these challenges and to add value in the CMC context. But with each new methodology, the CMC Statistician faces a multitude of challenges. This session includes case studies that showcase new applications or elucidate on the respective challenges in applying novel methodologies.

Chairpersons: **Timo BAILER,** Boehringer-Ingelheim; **Theo KOULIS**, Genentech

10:00am **Session Introduction, Theo KOULIS**, Genentech

10:05am The Future of mRNA Production: A Case Study in Continuous Manufacturing via QbD, PAT and Digital Twins
Gang WANG; Mark GENG, Moderna

10:35am A Modern Approach to Stability Studies for Life Cycle Products by Using a Bayesian LMEM Framework
Tobias EILERT, PhD., Boehringer Ingelheim

11:05am **Break**

11:20am **Parallel Breakout Sessions**
Topic 1 – Bayesian – **Jia LIU,** Pfizer
Topic 2 – Statistical Software for Non-statisticians – **JoAnn COLEMAN**, Spark Therapeutics

12:20pm Stability-data Quality From An Arrhenius Perspective
Cristian Oliva AVILES, PhD., Genentech

12:50pm **Panel Discussion**
Facilitator: Timo BAILER, Boehringer Ingelheim
Panelists: Tobias EILERT; **Cristian Oliva AVILES**; **Gang WANG; Mark GENG**

1:50pm **Workshop Summary**
Julia O'Neill, Moderna

2:00pm **Close of Workshop and Invitation to 2023 Workshop**