Host: Pfizer

FALL 2017
PRISME Forum Technical Meeting

PRISME Forum Chair: **Olivier Gien**
VP, Global Head, Medical IT, *Sanofi*

Technical Meeting Chair: **Keith Murphy**
Senior Director, R&D Business Technology, *Pfizer*

PRISME Forum
Statement of Compliance

"All meetings, working groups and communications will be open to all Members and any records thereof will be non-confidential and available for inspection by any Member.

The Members acknowledge that discussing any commercially sensitive topics, including costs, volumes, inventories, sales level methods, channels of distribution, access to future products, markets, current or future prices, profitability, ***contract pricing or trading terms*** is prohibited.

The Members of PRISME will strictly comply with all laws relevant to their activities, including US state and federal anti-trust laws and European competition laws."

Host

M. Hall Gregg, VP, Business Technology, R&D

Wendy Corr, Administrative Lead

PRISME Forum
Technical Meeting Advisory Committee

Keith Murphy - Chair, *PRISME Forum* Technical Meeting; Senior Director, R&D Business Technology, *Pfizer*

Olivier Gien, Chair, PRISME Forum; VP, Global Head, Medical IT, *Sanofi*

John Apathy, Vice President, R&D Informatics, *Celgene*

Massimo de Francesco, Senior Director, Head of Informatics, *UCB*

Lars Greiffenberg, Director R&DIR and Translational Informatics, *AbbVie*

Klaus Hofenbitzer, Senior Director, Enterprise Architecture, *Celgene*

Sebastian Lefebvre, Senior Director Data Analytics & Decision Support, *Alexion Pharmaceuticals, Inc.*

Errol Sandler, Board Treasurer/Secretary, *PRISME Forum*

David Sedlock, Head, Global Research IT, *Takeda Pharmaceuticals*

Alex Schuleit, Senior R&D Business IT Development Manager, *Lundbeck*

Ashok Upadhyay, Senior Director, Global R&D IT, *Otsuka Pharmaceutical Companies*

John Wise, Program Coordinator, *PRISME Forum*

Nico Stanculescu, Secretariat, *PRISME* Forum

2017 Fall

PRISME Forum Technical Meeting Theme:

The Potential of Artificial Intelligence in Healthcare

The Merriam-Webster dictionary defines **Artificial Intelligence** as a: branch of computer science dealing with the simulation of intelligent behavior in computers and/or the capability of a machine to **imitate intelligent human behavior**.

The two characteristics of AI that are often most closely associated to human intelligence are **"learning" and "problem solving"**. There are many technologies, both emerging and established, that fall into this general category. These include machine learning, neural networks, deep learning, and natural language processing, to name a few. These technologies have the **potential to significantly impact the pharmaceutical industry**, and more broadly the healthcare industry, in the next decade.

On the other hand, while we are seeing genuine advances in AI, we are also seeing an **acceleration of the hype**. Expectations are likely outpacing the technologies' readiness to deliver at scale. Nevertheless, many technologists have **confidence in the underlying approach** and capabilities being developed today.

At the PRISME Forum Fall 2017 Technical Meeting, we will explore **promising applications of AI in Biopharmaceutical R&D**, as well as relevant initiatives in other industry sectors. We will address best practices from the perspective of the **supporting infrastructure**, e.g. data, compute, platforms and policy. It is understood that data is foundational to the application of AI technologies; as such this Technical Meeting is a logical follow-up to our PRISME Forum Spring 2017 data-focused discussions.

1
NETWORK:

unique gathering of industry and technology experts

2
LEARN:

exposure to new companies, ideas and applications

3
EXPLORE:

act on identified opportunities post-meeting

PRISME Forum
Technical Meeting Goals

PRISME Forum Technical Meeting Agenda (morning)

	THURSDAY, November 16, 2017	
08:30	Welcome Notes & Introductions	**Olivier Gien**, VP, Global Head Medical IT, *Sanofi*; Chair, *PRISME Forum* **Keith Murphy**, Senior Director, R&D Business Technology, *Pfizer*; Technical Meeting Chair, *PRISME Forum*
SESSION I: Keynote Presentations **AI in Biopharma R&D & Healthcare**		Chair: **Keith Murphy**, Senior Director, R&D Business Technology, *Pfizer*; Technical Meeting Chair, *PRISME Forum*
08:45	Precision Medicine and Targeted Marketing - A Medical Doctor's perspective	**Anthony Philippakis**, Chief Data Officer, *Broad Institute*
09:20	A Technology Consultant's perspective	**Michael Shanler**, VP, Research, *Gartner*
09:55	Coffee Break	
SESSION II: **Shark Tank aka Dragon's Den Session**		Co-Chairs: **Klaus Hofenbitzer**, Senior Director, Enterprise Architecture, *Celgene* **Ashok Upadhyay**, Global R&D IT Leader, *Otsuka Pharmaceutical Companies*
10:25	Introduction	
10:30	Start-up #1 with Q&A: **Precision Digital Health** – Thomas Wells, CEO & Co-founder	Introduced by *Brooks Hill Partners*
10:45	Start-up #2 with Q&A: **nQ Medical** – Richie Bavasso, CEO, Co-founder Scientist	Introduced by **Eyal Geffen**, Managing Partner, *Sky Ventures*
11:00	Start-up #3 with Q&A: **Asimov** – Raja Srinivas, Co-founder	Introduced by **Mark McAndrew**, Partner, *Andreessen Horowitz*
11:15	Start-up #4 with Q&A: **Freenome** – Imran Haque, CSO	Introduced by **Mark McAndrew**, Partner, *Andreessen Horowitz*
11:30	Start-up #5 with Q&A: **Wellth** – Matthew Loper, CEO/Co-founder	Introduced by *Beta Bridge Capital*
11:45	Conclusions	
	PRISME Forum Shark Tank Evaluation Panel Members: **Klaus Hofenbitzer (co-chair),** Senior Director, Enterprise Architecture, *Celgene* **Munther Baara,** Senior Director, Development Business Technology, *Pfizer* **Heather Bell,** Senior Vice President, Global Head of Digital and Analytics, *Sanofi* **David Sedlock,** Head, Global Research IT, *Takeda Pharmaceuticals* **Ashok Upadhyay (co-chair),** Global R&D IT Leader, *Otsuka Pharmaceutical Companies*	

SESSION III A: Posters	Chair: John Apathy, VP, R&D Informatics, *Celgene*	
11:55	Introduction	
12:00	Poster Rotations (three 15-minute rotations)	
P1	Smart Molecular Similarity Search	**Ari Yacobi**, Chief Data Scientist, *Knowledgent* Tom Johnstone, Managing Partner, Life Sciences, *Knowledgent*
P2	AI in Patient Stratification – From 'omics to Digital Biomarkers	**Tim Guilliams**, CEO, *Healx* **David Brown**, Chairman and CSO, *Healx*
P3	AI and Analytics on Smart Device Data Capture: Successful Passive Monitoring of Early-Stage Parkinson's Disease Patient Mobility in a Phase I RG7935/PRX002 Clinical Trial with Smartphone Sensors	**Wei-Yi Cheng**, Senior Scientist, *Roche Innovation Center New York*
P4	AI - Combining Biological Science with Machine Learning	**Christopher Gibson**, Co-Founder and CEO, *Recursion Pharmaceuticals*
P5	Machine Learning to Machine Teaching: Intelligence By Design	**Akshay Vashist**, Director - Data Sciences, *Otsuka Pharmaceutical Companies*
P6	AI – Application of IBM Watson's Cognitive Computing Capabilities in Research	**John Gregory**, Director, Project & Portfolio Management Business Technology, *Pfizer*
12:45	Lunch	

SESSION III B: Posters (cont.)	Chair: **John Apathy**, VP, R&D Informatics, *Celgene*
13:45	Poster Session (Remaining three 15-minute rotations)

PRISME Forum Technical Meeting Agenda (afternoon)

SESSION IV: **Plenary Presentations - AI in Biopharma R&D**		**Chair: Alex Schuleit,** Senior R&D Business IT Development Manager, *Lundbeck*
14:30	AI in Biopharma: A Biopharmaceutical Industry Perspective	**Debbie Profit**, VP, Information Technologies, *Otsuka Pharmaceuticals*
15:00	A CRO perspective	**Gary Shorter**, Head of AI, R&D Solutions, *QuintilesIMS*
SESSION V: **Break-out Session & Coffee**		**Co-Chairs: Massimo de Francesco,** Senior Director, Head of Informatics, *UCB* **Sebastien Lefebvre,** Senior Director Data Analytics & Decision Support, *Alexion Pharmaceuticals*
15:30	Breakout Session – Members and meeting guests will be divided into five groups led by co-captains	Co-captains: Group A: **Klaus Hofenbitzer (lead) supported by start-up #1** Group B: **Munther Baara (lead) supported by start-up #2** Group C: **Heather Bell (lead) supported by start-up #3** Group D: **David Sedlock (lead) supported by start-up #4** Group E: **Ashok Upadhyay (lead) supported by start-up #5**
16:00	Plenary Session – Readouts from breakout groups	Chair: **Lars Greiffenberg**, Director - R&D IT and Translational Informatics, *AbbVie*
SESSION VI: **Meeting Summary, Awards & Reception**		Chair: **Keith Murphy,** Senior Director, R&D Business Technology, *Pfizer*; Technical Meeting Chair, *PRISME Forum*
16:30	Meeting Summary	
16:45	Awards & Networking Reception	

SESSION I: Keynote Presentations:
AI in Biopharma R&D & Healthcare

Chair: **Keith Murphy**, Senior Director, Business Technology, *Pfizer*; Technical Meeting Chair, *PRISME Forum*

Anthony Philippakis, Chief Data Officer, *Broad Institute*

**Precision Medicine and Targeted Marketing -
A Medical Doctor's perspective**

Michael Shanler, VP, Research, *Gartner*

A Technology Consultant's Perspective

SESSION II

Shark Tank

Co-Chairs:

Klaus Hofenbitzer, Senior Director, Enterprise Architecture, *Celgene*

Ashok Upadhyay, Global R&D IT Leader, *Otsuka Pharmaceutical Companies (U.S.)*

The session's objective is to provide a constructive yet relaxed activity to encourage interaction between PRISME Forum members, the VC community and five start-up companies with a value proposition relevant to the context of the meeting's theme, i.e., AI in biopharma, R&D and Healthcare.

RATIONALE

PRISME Forum members get introduced earlier than they otherwise would to relevant life science R&D/healthcare AI-based business propositions.

VCs have an opportunity to meet members of the PRISME Forum and better understand the kinds of problems that these R&D IT leaders are facing – such that they might better identify the start-up companies with relevant business ideas.

Start-up companies have an opportunity to interact with members of the PRISME Forum and get some constructive feedback about their business propositions.
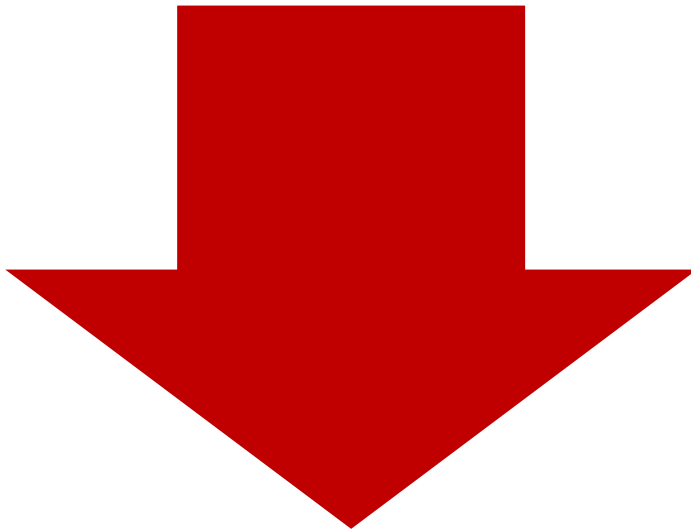
Session II: Shark Tank

Time	Agenda Item	Comments
10:40	Brief Introductions	• Introductions: Moderator and Panel • Process • Introductions of Startups and VCs
10:45	Each Startup pitch is followed by Q&A (panel and audience)	• Panel to take notes and complete scoring spreadsheet provided and provide helpful feedback
11:45	Conclusion	
11:50-12:30	Results	• Panel to consolidate results
16:45	Awards & Networking Reception	• Announce the "Favorite Presentation" and readout feedback

Questions Guide

ASK QUESTIONS ABOUT:

- what the proposed solution does
- what is the unmet need that the start-up is trying to address
- the value proposition
- anticipated users/customers
- market size etc.

DO NOT ASK QUESTIONS:

- which could lead to the exposure of any competitive information and/or IP, e.g.
- regarding technical details
- regarding how the solution works in detail
- which could lead to too many opinions about viability or presumed success in the market

Panel Assessment Sheet

1=unclear to 5 = clear/excellent

Criteria	Startup #1 Precision Digital Health	Startup #2 nQ Medical	Startup #3 Asimov	Startup #4 Freenome	Startup #5 Wellth
The value proposition, business value					
The clarity and energy of the 'pitch'					
Response to Q&A					
Any other compelling points					
Total Points:					

Panel Assessment Sheet – Company Feedback

Please provide any helpful feedback and advice to our startup companies

c	Comment / Advice
#1 Precision Digital Health	
#2 nQ Medical	
#3 Asimov	
#4 Freenome	
#5 Wellth	

Startups

Precision Digital Health

- Big data analytics applied to real world data
- precisiondigitalhealth.com/

nQ Medial

- Using wearable device data to inform disease progression. Using machine learning to better interpret wearable data.
- www.nq-medical.com/

Asimov

- Using DNA-encoded circuits in living cells. Article:
  news.mit.edu/2016/programming-language-living-cells-bacteria-0331
- www.asimov.io/

Wellth

- Novel approach to encourage and document patient medication dosing compliance
- www.wellthapp.com

Thomas Wells

Richie Bavasso
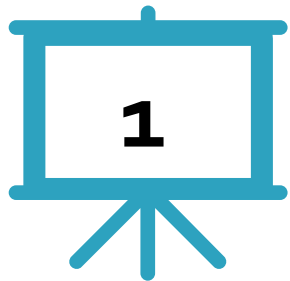
Raja Srinivas

Matthew Loper
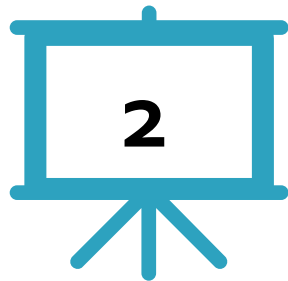
SESSION III

Posters

Chair: John Apathy, VP, R&D Informatics, *Celgene*

SESSION III A: Posters

Chair: John Apathy, VP, R&D Informatics, *Celgene*

11:55	Introduction	
12:00	Poster Rotations (three 15-minute rotations)	
P1	Smart Molecular Similarity Search	**Ari Yacobi,** Chief Data Scientist, *Knowledgent* Tom Johnstone, Managing Partner, Life Sciences, *Knowledgent*
P2	AI in Patient Stratification – From 'omics to Digital Biomarkers	**Tim Guilliams,** CEO, *Healx* **David Brown,** Chairman and CSO, *Healx*
P3	AI and Analytics on Smart Device Data Capture: Successful Passive Monitoring of Early-Stage Parkinson's Disease Patient Mobility in a Phase I RG7935/PRX002 Clinical Trial with Smartphone Sensors	**Wei-Yi Cheng,** Senior Scientist, *Roche Innovation Center New York*
P4	AI - Combining Biological Science with Machine Learning	**Christopher Gibson,** Co-Founder and CEO, *Recursion Pharmaceuticals*
P5	Machine Learning to Machine Teaching: Intelligence By Design	**Akshay Vashist,** Director - Data Sciences, *Otsuka Pharmaceutical Companies*
P6	AI – Application of IBM Watson's Cognitive Computing Capabilities in Research	**John Gregory,** Director, Project & Portfolio Management Business Technology, *Pfizer*
12:45	Lunch	

SESSION III B: Posters (cont.)

Chair: **John Apathy,** VP, R&D Informatics, *Celgene*

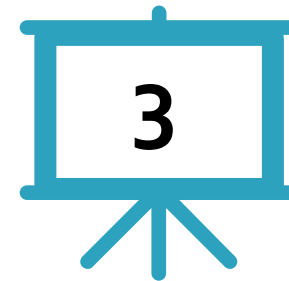| 13:45	Poster Session (Remaining three 15-minute rotations)	

1 **Ari Yacobi,** Chief Data Scientist, *Knowledgent* **Tom Johnstone,** Managing Partner, Life Sciences, *Knowledgent*
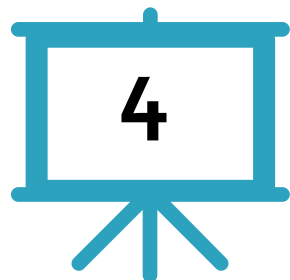
Smart Molecular Similarity Search

2 **Tim Guilliams,** CEO, *Healx* **David Brown,** Chairman and CSO, *Healx*

AI in Patient Stratification – From 'omics to Digital Biomarkers

3 **Wei-Yi Cheng,** Senior Scientist, *Roche Innovation Center New York*

AI and Analytics on Smart Device Data Capture: Successful Passive Monitoring of Early-Stage Parkinson's Disease Patient Mobility in a Phase I RG7935/PRX002 Clinical Trial with Smartphone Sensors
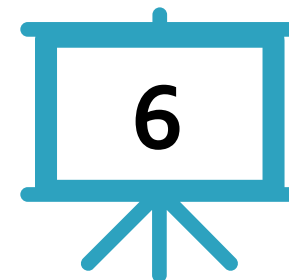
4 **Christopher Gibson,** Co-Founder and CEO, *Recursion Pharmaceuticals*

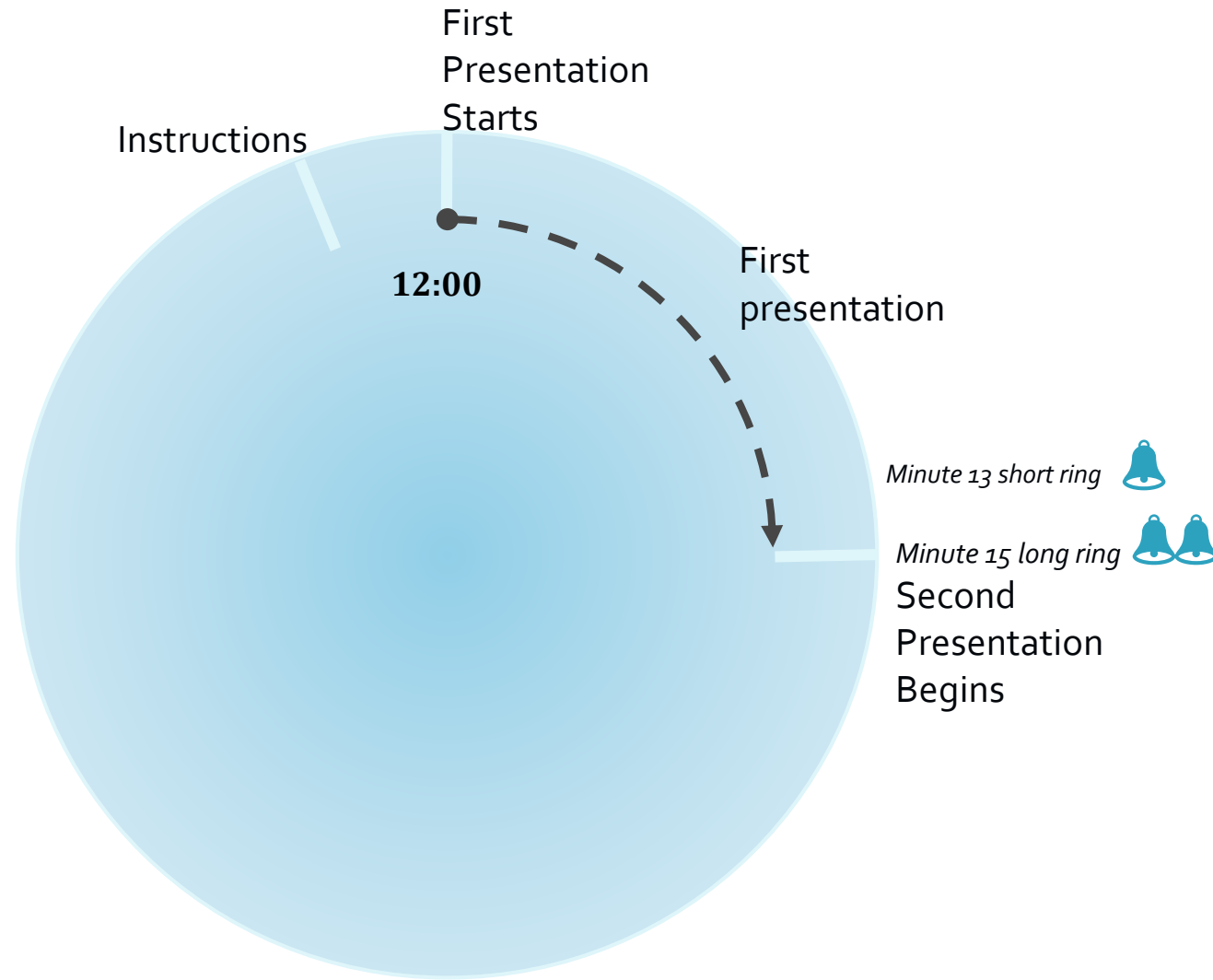AI - Combining Biological Science with Machine Learning

5 **Akshay Vashist,** Director - Data Sciences, *Otsuka*

Machine Learning to Machine Teaching: Intelligence By Design

6 **John Gregory,** Director, Project & Portfolio Management Business Technology, *Pfizer*

AI – Application of IBM Watson's Cognitive Computing Capabilities in Research

Instructions

First
Presentation
Starts

12:00

First
presentation

Minute 13 short ring 🔔

Minute 15 long ring 🔔🔔

Second
Presentation
Begins

INSTRUCTIONS @11:55am

Session Chair will invite participants to take their seats.

Chair will open the session by introducing the presenters, their posters, along with the session structure and flow.

PRISME Forum staff will ring the bell on each rotation *(one ring at minute 13 of each presentation and then a longer ring at minute 15 when the presentation must end).*

Delegates are invited to identify the color of their lanyard and match to rotation called out by staff: "Rotation 1, 2, …n".

Rotations will involve shift of participants' groups to the next poster on their right.

PRISME Forum Technical Meeting Agenda (afternoon)

SESSION IV: **Plenary Presentations - AI in Biopharma R&D**		**Chair: Alex Schuleit,** Senior R&D Business IT Development Manager, *Lundbeck*
14:30	AI in Biopharma: A Biopharmaceutical Industry Perspective	**Debbie Profit**, VP, Information Technologies, *Otsuka Pharmaceuticals*
15:00	A CRO perspective	**Gary Shorter**, Head of AI, R&D Solutions, *QuintilesIMS*
SESSION V: **Break-out Session & Coffee**		**Co-Chairs: Massimo de Francesco,** Senior Director, Head of Informatics, *UCB* **Sebastien Lefebvre,** Senior Director Data Analytics & Decision Support, *Alexion Pharmaceuticals*
15:30	Breakout Session – Members and meeting guests will be divided into five groups led by co-captains	Co-captains: Group A: **Klaus Hofenbitzer (lead) supported by start-up #1** Group B: **Munther Baara (lead) supported by start-up #2** Group C: **Heather Bell (lead) supported by start-up #3** Group D: **David Sedlock (lead) supported by start-up #4** Group E: **Ashok Upadhyay (lead) supported by start-up #5**
16:00	Plenary Session – Readouts from breakout groups	Chair: **Lars Greiffenberg**, Director - R&D IT and Translational Informatics, *AbbVie*
SESSION VI: **Meeting Summary, Awards & Reception**		Chair: **Keith Murphy**, Senior Director, R&D Business Technology, *Pfizer*; Technical Meeting Chair, *PRISME Forum*
16:30	Meeting Summary	
16:45	Awards & Networking Reception	

SESSION IV:
Plenary Presentations - AI in Biopharma R&D

Chair: Alex Schuleit, Senior R&D Business IT Development Manager, *Lundbeck*

Debbie Profit, VP, Information Technologies
Otsuka Pharmaceutical Companies

AI in Biopharma:
A Biopharmaceutical Industry Perspective

Gary Shorter, Head of AI, R&D Solutions
QuintilesIMS

AI in Development

SESSION V: Brainstorm
Breakout Session – What should we consider to benefit from AI

Skills	Data	Organization	Infrastructure	Metrics
Group A Klaus Hofenbitzer Celgene	**Group B** Munther Bara Pfizer	**Group C** Heather Bell Sanofi	**Group D** David Sedlock Takeda	**Group E** Ashok Uphadyay Otsuka
• The skill sets that we should be developing in R&D IT in order to exploit and embrace AI	• Data related constructs (e-g. big data engines, data quality initiatives/master, data stewardship, meta-data) and business alignment	• Organizational assignments and design (e-g. are there dedicated roles, and were should they sit?)	• Infrastructure (HPC, cloud, secure sharing with external partners)	• Develop a Boston square to create a diagram that can inform the meeting on the potential value of, and the difficulty in, implementing AI-based technologies in Biopharma R&D and Healthcare

BREAKOUT GROUPS

GROUP A - Co-captains:
Klaus Hofenbitzer *(Celgene)* and Thomas Wells *(Precision Digital Health)*

Danielle Ciofani (Broad Institute)

Matteo di Tommaso (Biogen)

Remy Evard (Novartis)

Steven Frederick (Moderna)

Christopher Gibson (Recursion Pharmaceuticals)

Lars Greiffenberg (AbbVie)

Steve Howes (Pfizer)

Mark McAndrew (Andreessen Horowitz)

Carol Rohl (Merck)

Carl Ruel (Sunovion)

Jean-Luc Schmidt (Sanofi)

Andy Siegel (Sanofi)

Ari Yacobi (Knowledgent)

GROUP D - Co-captains:
David Sedlock *(Takeda)* and Imran Haque *(Freenome)*

David Brown (Healx)

Michael Cassidy (Regeneron)

David Christie (Amgen)

Ib Groth Clausen (Novo-Nordisk)

Andreas Friese (Bayer)

Olivier Gien (Sanofi)

Martin Leach (Alexion)

Tomoyuki Matsunaga (Takeda)

Keith Murphy (Pfizer)

Scott Oloff (B-I)

Ludovic Otterbein (Lundbeck)

Michael Shanler (Gartner)

Xin Zhang (Celgene)

GROUP B - Co-captains:
Munther Baara *(Pfizer)* and Richie Bavasso *(nQ Medical)*

Teresa Arroyo-Gallego (nQ Medical)

Alastair Binnie (BMS)

Antoine Bril (Servier)

Dan Chapman (UCB)

Béatrice Chapuzet (Servier)

Joel Ekstrom (Ionis)

Martin Erkens (Roche)

Thomas Frei (Novartis)

Sebastien Lefebvre (Alexion)

Naresh Sethi (Otsuka)

Susie Stephens (Pfizer)

Romain Taillard (Roche)

Akshay Vashist (Otsuka)

GROUP E - Co-captains:
Ashok Upadhyay *(Otsuka)* and Matthew Loper *(Wellth)*

Andrew Allen (Regeneron)

Wei-Yi Cheng (Roche)

Massimo de Francesco (UCB)

Tara Gorney (GSK)

Tim Guilliams (Healx)

Tom Johnstone (Knowledgent)

Bruno Larmurier (Servier)

Debbie Profit (Otsuka)

Michael Robbins (Celgene)

Gary Shorter (QuintilesIMS)

Jason Swift (AstraZeneca)

Brad Wintermute (FDA)

GROUP C - Co-captains:
Heather Bell *(Sanofi)* and Raja Srinivas *(Asimov)*

John Apathy (Celgene)

Sherry Cao (AbbVie)

Eyal Geffen (Sky Ventures)

Mary Hall Gregg (Pfizer)

John Gregory (Pfizer)

David Johnson (Moderna)

Roy Ladd (AbbVie)

Greg Moody (Biogen)

Anthony Philippakis (Broad Institute)

Alex Schuleit (Lundbeck)

Tatsuyuki Takahashi (Mitsubishi Tanabe)

Dustin Tarditi (GSK)

Captain readouts: (5-6 min each)

What was the focus of your groups discussion?

What were 2-3 key learnings about which you think the PRISME Forum members should be acting upon, in order to achieve the full potential of AI?

Anything else that you want to share as a learning from your breakout group?

Lars Greiffenberg: Leading Q&A

SESSION V

MEETING SUMMARIES AND AWARDS

Chair: **Keith Murphy**, Senior Director, R&D Business Technology, *Pfizer;*

Technical Meeting Chair, *PRISME Forum*