PRISME Forum

Pharmaceutical R & D Information Systems Management Executives

PRISME Forum
TECHNICAL MEETING

Where Technology Creates Value for Pharma R&D

PRISME Forum Chair:

Dan Chapman, Head, IT Early Solutions Information Management, *UCB*

PRISME Forum Technical Meeting Chair:

Andreas Friese, Head, Early Development IT Business Partnering Pharma, *Bayer*

November 20-21, 2019

Boston, MA, USA

Host: Alexion

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PRISME Forum Fall 2019 Technical Meeting App:

http://my.yapp.us/PRISMETECH

Meeting Venue

The PRISME Forum Fall 2019 Business Meeting will be hosted by Alexion and held at:
121 Seaport Blvd, Boston, MA 02210

Hotel

Renaissance Boston Waterfront, 606 Congress St, Boston, MA 02210

Contacts

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PRISME Forum Technical Meeting Advisory Committee

Andreas Friese (chair), Head, R&D-IT Early Development, *Bayer*

Christian Baber, Head, Scientific Informatics, *Takeda*

Michael Cassidy, Executive Director, Head of Research IT at Regeneron Pharmaceuticals, Inc., *Regeneron*

Lars Greiffenberg, Director R&D Information Research, Library Sciences & Academic Partnership, *AbbVie*

Martin Leach, Vice President R&D IT, Global Quality IT and HR IT at Alexion Pharmaceuticals, Inc., *Alexion*

Tomoyuki Matsunaga, Head, Research Management Systems, Research IT at Takeda Pharmaceutical Company Ltd, *Takeda*

Nico Stanculescu, Logistics, *PRISME Forum*

Scott Oloff, Exec. Director, IT Research, Development, and Medicine Enablement, *Boehringer Ingelheim*

Susie Stephens, Senior Director, Analytics & Master Data Architecture, *Pfizer*

John Wise, Program Coordinator, *PRISME Forum*

PRISME Forum Host

The PRISME Forum Technical Meeting Advisory Committee would like to thank Alexion for hosting the 2019 PRISME Forum Fall meeting.

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."

PRISME Forum Technical Meeting Advisory Committee

PRISME Forum Technical Meeting Chair: Andreas Friese

Head, Early Development IT Business Partnering Pharma, *Bayer*

Andreas Friese, MS, started his professional career as a software developer in 1987 at Schering AG, Berlin, Germany. From the beginning, he focused on IT solutions that addressed specific needs of the Research organization. Over the years, he held various positions as system analyst and project manager – all with focus on Research specific systems or projects.

In 1999, Mr. Friese moved to Richmond, CA, USA as an IT Business Partner for the Medicinal Chemistry department of Berlex Biosciences. During the merger of Schering AG with Bayer AG, he returned to Germany.

Based in Wuppertal, he heads the Early Development IT Business Partnering Pharma for Bayer.

Christian Baber

Head, Scientific Informatics, *Takeda*

Christian Baber, PhD, is a chemist by training and holds undergraduate and PhD degrees in computational chemistry with a focus on AI techniques to assess the synthetic accessibility of de novo design compounds. Christian continued this work with a post-doctoral fellowship on the automated design of targeted combinatorial libraries at the Department of Knowledge Engineering, Osaka University, Japan before moving into industry as a computational chemist and cheminformatician.

Christian has a wide breadth of experience across companies ranging from startups to Pfizer and diverse therapeutic areas with a focus on early stage lead identification and screening. Christian has been with Shire between 2015 and 2019 and is currently the Head of Scientific Informatics at Takeda.
Prior to Shire, Christian was the Head of Cheminformatics and Compound Management and Data Steward at Cubist Pharmaceuticals where, amongst other things, his team was responsible for automation, high-throughput screening, scientific programing and the corporate scientific database.

Michael Cassidy

Executive Director; Head, Research IT at Regeneron Pharmaceuticals, Inc., *Regeneron*

Lars Greiffenberg

Director R&D Information Research, Library Sciences & Academic Partnerships, *AbbVie*

Lars Greiffenberg, PhD, MS, holds a MS in Biology and a PhD in Microbiology and has more than 15 years of experience in the field of integrated R&D IT solutions and translational informatics. He held different R&D IT management positions at Aventis Pharma and Sanofi-Aventis in Frankfurt before relocating to the Sanofi site in Toulouse, France where he was Global Head of Solution Center Translational Medicine with responsibility to manage and lead a global program to enable translational science at Sanofi. In 2014 he joined AbbVie in Ludwigshafen (Germany) as director of R&D IT and Translational Informatics. In this role he is heading business IT support covering data and solutions from early discovery up to Medical Affairs. In 2017 he extended his responsibilities including now global Library Sciences at AbbVie.

He is driven by the ambition to transform the way we access, consume and leverage literature in the future. He recently established a team at AbbVie, dedicated to use modern methods and algorithms to extract and visualize mechanistic disease information from literature content. In 2018 he further enlarged his area of responsibility to incorporate the Academic Partnerships Organization which is leveraging an AbbVie-Campus at the University of Illinois Urbana-Champaign. Lars is active in several pre-competitive organizations including IMI, PRISME Forum, Pistoia Alliance and EIT-health.

Martin Leach

Vice President, R&D IT, Global Quality IT, HR IT, Enterprise Data Management & Analytics, *Alexion*

Martin Leach, PhD, has over 20 years' experience in Informatics and IT leadership in Biotech, Academia, and Pharmaceutical companies.

As Vice President IT at Alexion, Dr. Leach is currently responsible for the IT strategy and teams that provide technology and data solutions for R&D and Global Operations. Global Operations at Alexion is very broad covering all Facilities, CMOs & Manufacturing Plants and Global Quality Functions.

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Prior to The Broad Institute, he led IT in support of the research environment for Discovery & Preclinical Sciences at Merck. Finally, Dr. Leach is a Member of the Board of Directors at Smpl Bio and an advisory board member of Sierra Ventures and Canaan Partners venture companies.

Tomoyuki Matsunaga

Head of Research Management Systems, Research IT, *Takeda*

Tomoyuki Matsunaga, MBA, MSc, is Head of Research Management Systems in Global Information Technology at Takeda Pharmaceutical Company. His role is to lead any strategic IT operations for common management processes and workflows of research activities in conjunction with other functional research IT groups, such as Discovery, Preclinical and Translational Sciences. He is also the site IT manager at Shonan Research Center in Japan.

Mr. Matsunaga started his career in Central Research of Pfizer Japan in 1991 as a research scientist. After 5 years in Natural Product Screening department, he moved to Research IT group in the company and worked on various projects of global discovery research information systems. He joined Takeda in 2008 as an Associate Director in Research IT, and took the current position in 2014.

He obtained his MBA from Kenichi Ohmae Graduate School of Business and MSc, Medical Sciences from University of Tsukuba.

Scott Oloff

Executive Director, IT R&D and Medicine Enablement, *Boehringer-Ingelheim*

Scott Oloff, PhD, started his career as a Computational Chemist in Research where he worked for both Biogen and Boehringer Ingelheim.

His primary expertise was building and using machine learning algorithms for potency/ADMET predictions, docking, and research project support. In 2008 he took a position in Research IT within Boehringer Ingelheim overseeing data analytics and mining technologies.

Over time he has expanded into a number of IT R&D roles where he now oversees all technologies that are shared across the Research, Development, and Medicine business areas (Analytics, Chemistry tools, ELN's, Lab technologies, LIMS, Document Mgmt tools, etc.).

Scott holds a B.S. in Chemical Engineering from Clemson University and a PhD in Pharmacology from the University of North Carolina.

John CM Wise

Program Coordinator, *PRISME Forum*

John Wise, MA, is the Program Coordinator for the PRISME Forum and is also a consultant at the Pistoia Alliance with responsibilities that include business development and member relations. He specializes in the coordination of pre-competitive collaborations in life science R&D IT and has had a long-time commitment to encouraging pharma to use expert, third-party, cost-effective, regulatory-compliant, secure, hosted information services.

Previously, Mr. Wise has held Informatics leadership roles in a variety of organizations including the University of London, Sandoz, the Imperial Cancer Research Fund (now CRUK), Roche, Ipsen and Daiichi Sankyo.

He has also worked in the technology supply side of the industry. In these roles, he has gained direct hands-on experience writing analytical software, teaching computation, delivering IT services, and providing computer-based services to the discovery, non-clinical development, clinical development, and regulatory affairs domains of the life-science industry.

Where Technology Creates Value for Pharma R&D

Recent PRISME Forum Technical Meetings have focused on initiatives relevant to the value of data, artificial intelligence, and "digital". The Fall 2019 PRISME Forum Technical Meeting will concentrate on technology initiatives which clearly create value from a Pharma R&D perspective.

Creating value can come in at least three different forms. In particular, by means of technology:

1) improving efficiency and/or effectiveness of R&D processes, which leads to lower costs for R&D

2) enabling a faster time-to-market, which enables R&D assets to generate revenues sooner

3) creating new streams of revenue

4) Timely response to new scientific innovations

The contributions that IT and Digital can make to address these needs in Research, non-Clinical Development (including CMC) and the Development domains, will be explored.

This could include information on how IT would be involved in new research modalities (such as CRISPR-Cas9, CAR-T, PROTACs, the Microbiome and anti-bacterial phage engineering). In non-clinical development, Stem Cell Toxicology could offer significant advantages in terms of quality, speed, cost and ethics. "Digital" and AI may offer significant opportunities in all these areas of value creation mentioned above.

Program

PRISME Forum Fall 2019 Technical Meeting

Technical Meeting sessions will be held at Alexion's campus located at 121 Seaport Blvd, Boston, MA 02210

WEDNESDAY, November 20, 2019		
19:00	*Welcome Reception at Hopsters located at 51 Sleeper Street, Boston, MA 02110 (walking distance from meeting venue/main hotel)*	
THURSDAY, November 21, 2019 ***Alexion, Meeting Room Guiding Star 314***		
07:30	*Departure from conference hotel (Renaissance Boston Waterfront) – please remember to have a photo ID!*	
08:00	*Check-in, poster installation and refreshments*	
08:25	**Welcome Notes & Introductions**	**Dan Chapman,** Head, IT Early Solutions Information Management, *UCB*; Chair, *PRISME Forum* **Andreas Friese,** Head, Early Development IT Business Partnering Pharma, *Bayer*; Technical Meeting Chair, *PRISME Forum*
08:30	**SESSION I: PRESENTATIONS AND DISCUSSION**	**Chair: Andreas Friese,** Head, Early Development IT Business Partnering Pharma, *Bayer;* Technical Meeting Chair, PRISME Forum
08:30	**Personalized healthcare at Roche**	**Niaz Jalal,** Global Head, Digital Health Platforms, Personalized Healthcare, Product Development, *Genentech*
09:00	**Where technology creates value for Pharma R&D** • What are the interesting examples of where technology has created value for R&D? • How does R&D measure the value that technology brings? • What are the top three things R&D is doing differently to embrace technology?	**Moderator: Andreas Friese,** Head, Early Development IT Business Partnering Pharma, *Bayer* **Christian Baber,** Head, Scientific Informatics, *Takeda* **Martin Leach,** VP R&D IT, Global Q IT, Enterprise Data Mgmt. & Analytics, *Alexion* **Carol Rohl,** Executive Director, Global Research IT & Informatics, *Merck* **Ed Trautman,** Vice President, Science and Clinical Analytics and Informatics**,** *Pfizer*
09:45	**The technology fallacy: how people are the real key to digital transformation**	**Michael Church,** Managing Director, *Deloitte Consulting* **Martin Leach,** VP R&D IT, Global Q IT, Enterprise Data Mgmt. & Analytics, *Alexion* **Anh Phillips,** Senior Manager, *Deloitte's CIO Program*
10:15	*Coffee Break*	
10:45	**SESSION II: PERSPECTIVES COMPUTING OF THE FUTURE**	**Chair: Scott Oloff,** Executive Director, IT Research, Development, and Medicine Enablement, *Boehringer Ingelheim*
10:45	**Accelerating drug discovery using quantum computing**	**Bhushan Bonde,** Head, IT Early Solutions Innovation Development, *UCB*
11:00	**Quantum computing – a new approach to study human disease patterns?**	**Ulf Hengstmann**, BP Medical Affairs & Pharmacovigilance, *Bayer*
11:15	**When is quantum advantage/supremacy, when and how will it happen?**	**Christopher Savoie**, CEO, *Zapata Computing*
11:30	**Digital Annealer**	**Taisuke Iwai,** Head, Digital Annealer Unit, *Fujitsu*
11:45	**Panel Discussion (all contributors to this session)**	**Moderator: Scott Oloff,** Executive Director, IT Research, Development, and Medicine Enablement, *Boehringer Ingelheim*

THURSDAY, November 21, 2019 *Alexion, Meeting Room TBD*			
12:10	**SESSION III A: POSTERS**		**Chair: Martin Leach,** VP R&D IT, Global Q IT, Enterprise Data Mgmt. & Analytics, *Alexion*
12:10	**Introduction to the poster presentations**		
12:15	*Poster Rotations (Three 10-minute rotations)*		
	P1	**Unsupervised annotation of phenotypic abnormalities via semantic latent representations on electronic health records**	**Vibhor Gupta,** Director and Founder, *Pangaea* **Jingqing Zhang,** *Pangaea*
	P2	**Autonomous laboratory robots are here!**	**Oskari Vinko,** Co-founder, *UniteLabs*
	P3	**Single platform integration of microbiome and antimicrobial resistance analytics and content**	**Jonathan Jacobs,** Director, Global Product Management, Genomic Analysis, QIAGEN
	P4	**GxP compliant data transfer of wearable device data in clinical trials: a case study in Friedreich Ataxia**	**Ariel Dowling,** Associate Director, Digital Clinical Devices, *Takeda* **Matthew Johnson,** General Manager, Chief Commercial Officer, *APDM*
	P5	**Personalized health solutions case study: myPKFiT**	**Jennifer Craig Cordova**, Global Head, R&D Connected & Software Medical Device, *Takeda*
12:45	*Lunch Break*		
13:40	**SESSION III B: POSTERS**		**Chair: Martin Leach,** VP R&D IT, Global Q IT, Enterprise Data Mgmt. & Analytics, *Alexion*
	Poster Session (Remaining two 10-minute rotations)		
14:00	**SESSION IV: PRESENTATIONS**		**Chair: Andreas Friese**, Head, Early Development IT Business Partnering Pharma, *Bayer;* Technical Meeting Chair, *PRISME Forum*
14:00	**Digital health investing: Boehringer Ingelheim venture fund**		**Debbie Lin**, Executive Director, *Boehringer Ingelheim Venture Fund|Digital Health*
14:30	**Focus on AI/ML, contrasting with big-data, and implications/opportunities in the life sciences**		**John Reynders,** Vice President, Data Sciences, Genomics, and Bioinformatics, *Alexion Pharmaceuticals*
15:00	*Coffee Break*		
15:30	**SESSION V: PRESENTATIONS**		**Chair: Tomoyuki Matsunaga,** Business Partner & Shonan Site IT Head, Scientific Informatics, Global IT, *Takeda*
15:30	**Multi-disciplinary computational urban sciences research in emerging data driven applications**		**Jibonananda (Jibo) Sanyal,** Group Leader and Senior Scientist**,** *Oak Ridge National Laboratory*
16:00	**A digital therapeutic and its R&D journey – tales from the road**		**Hank Wu**, Chief Digital Officer, *Luminopia*
16:30	**SESSION VI: MEETING SUMMARY, AWARDS & RECEPTION**		**Chair: Andreas Friese,** Head, Early Development IT Business Partnering Pharma, *Bayer*; Technical Meeting Chair, *PRISME Forum*
16:30	Meeting Summary		
16:40	Awards		
16:45	Networking Reception at Alexion		
18:00	*Return to Conference Hotel*		
19:00	*Informal dinner (gather in the hotel lobby for walk to restaurant)*		

Bios and Abstracts

PRISME Forum Chair: Dan Chapman

Head, IT Early Solutions Information Management, *UCB*

Dan Chapman, PhD, is part of the leadership team within Informatics at UCB with responsibility for Software Development and Architecture and Therapeutic Informatics (UK). Dan has 15 years experience working within the Pharmaceutical industry in a variety of roles.

After completing a PhD in Chemistry at Warwick University, Dan transitioned to informatics during post doctoral research at Cambridge University as part of the CLIC consortium. Dan joined AstraZeneca in 1997 and worked on a variety of global projects before joining UCB in his present role in 2005. Since then, Dan has driven several projects to revolutionize the informatics platform within UCB and is currently actively involved in promoting Data Science across UCB.

PRISME Forum Technical Meeting Chair: Andreas Friese

Head, Early Development IT Business Partnering Pharma, *Bayer*

Andreas Friese, MS, started his professional career as a software developer in 1987 at Schering AG, Berlin, Germany. From the beginning, he focused on IT solutions that addressed specific needs of the Research organization. Over the years, he held various positions as system analyst and project manager – all with focus on Research specific systems or projects.

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SESSION I: Presentations and Discussion

SESSION CHAIR: Andreas Friese

Head, Early Development IT Business Partnering Pharma, *Bayer*
Technical Meeting Chair, *PRISME Forum*

Personalized Healthcare at Roche

Niaz Jalal

Genentech

In the future patients will own all of their healthcare data. This will make personalized healthcare the norm. Patients will have the benefit of their care providers intervention in real-time wherever they are. Niaz Jalal is an entrepreneur/inventor who has been at the forefront of technology delivering products for over 20 years. He will share insights developed during his experience at Facebook, NVIDIA, and Palm as well as his current role at Roche where he leads the effort for creating digital health products for patients.

Niaz Jalal

Global Head, Digital Health Platforms, Personalized Healthcare, Product Development, *Genentech*

Niaz Jalal, MBA, brings nearly 20 years experience successfully managing development of mobile devices and apps end-to-end throughout the product lifecycle, particularly through validation and scale-up for market launch.

Most recently he was the Head of Human Understanding & Virtual Humans at Facebook, developing features for the Oculus Virtual Reality platform based on tracking of movements of the human body. He joined Facebook in early 2017 with the acquisition of KLOOG, a healthcare device company he founded that focused on passive home-based monitoring of the elderly for changes in health status.

Niaz has also worked at a number of top tech companies over his career including Cisco, Sun Microsystems, Nvidia and Motorola. He holds a BS in Computer Engineering from San Jose State University and an Executive MBA from Saint Mary's College of California.

Panel Discussion: Where technology creates value for Pharma R&D

- What are the interesting examples of where technology has created value for R&D?
- How does R&D measure the value that technology brings?
- What are the top three things R&D is doing differently to embrace technology?

Moderator: Andreas Friese, Head, R&D-IT Early Development, *Bayer*; Technical Meeting Chair, *PRISME Forum*

Panelists:

Christian Baber

Head, Scientific Informatics, *Takeda*

Christian Baber, PhD, is a chemist by training and holds undergraduate and PhD degrees in computational chemistry with a focus on AI techniques to assess the synthetic accessibility of de novo design compounds. Christian continued this work with a post-doctoral fellowship on the automated design of targeted combinatorial libraries at the Department of Knowledge Engineering, Osaka University, Japan before moving into industry as a computational chemist and cheminformatician.

Christian has a wide breadth of experience across companies ranging from startups to Pfizer and diverse therapeutic areas with a focus on early stage lead identification and screening. Christian has been with Shire since 2015 and is currently the Head of R&D IT where he leads IT efforts for the worldwide Research and Development organizations, and is in the process of building out R&D Informatics after doing the same for the discovery functions. Prior to Shire, Christian was the Head of Cheminformatics and Compound Management and Data Steward at Cubist Pharmaceuticals where, amongst other things, his team was responsible for automation, high-throughput screening, scientific programing and the corporate scientific database.

Martin Leach

Vice President, R&D IT, Global Quality IT, HR IT, Enterprise Data Management & Analytics, *Alexion*

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As Vice President IT at Alexion, Dr. Leach is currently responsible for the IT strategy and teams that provide technology and data solutions for R&D and Global Operations. Global Operations at Alexion is very broad covering all Facilities, CMOs & Manufacturing Plants and Global Quality Functions.

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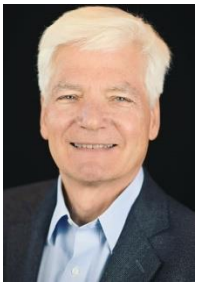
Ed Trautman

Vice President, Science and Clinical Analytics and Informatics, *Pfizer*



Edwin Trautman, PhD, Vice President, Science and Clinical Analytics and Informatics at Pfizer, has been involved with healthcare and technology for over three decades, serving on the staff at Massachusetts General Hospital and on the faculties of Harvard Medical School and MIT before growing several small businesses and leading healthcare technology groups.

Ed led development of the first commercial electronic medical record system at Cerner, of Internet-based pharmacy benefit management at CareInsite (now WebMD), and extended Harvard's evidence-based risk management and patient safety tools and services to many national healthcare systems as president of RMF Strategies.

More recently Ed was COO and led development of next generation DNA diagnostics and reporting at Correlagen prior to its acquisition by LabCorp in 2009 to seed its advanced genomics testing services and build clinical reporting. Dr. Trautman is currently part of Pfizer's new Digital Technology team driving digital transformation across the full spectrum of product research, development, manufacturing, commercialization and customer experiences.

Dr. Trautman received his BS, MS, and PhD in Electrical Engineering and Computer Science (Biomedical Engineering) from MIT.

Carol Rohl

Executive Director, Global Research IT & Informatics, Merck, *Pfizer*

Carol Rohl, PhD, is responsible for information technology and data strategy and solutions for Discovery, Preclinical and Early Discovery in MRL. She joined Merck and Co in 2005 as a member of the Rosetta Inpharmatics informatics group where she was initially responsible for pathway centric informatics analysis capabilities. Subsequently she became director of the molecular informatics group within the molecular profiling and research informatics department in Merck Research labs, with responsibility for genomic information systems and informatics capabilities in support of profiling, genomics and biomarker efforts. In 2010, she moved to MRL IT as part of the Informatics organization where she was responsible for translational informatics and built a health and clinical informatics capability within Informatics.

Prior to her current role, she established and led the Scientific Information Management within MRL IT, focused on advancing our maturity around effective management and use of information. Prior to joining Merck, Rohl was an assistant professor of biomolecular engineering at the University of California, Santa Cruz where she led a research team focused on the development and application of the Rosetta protein structure prediction algorithm to problems in protein design and protein fold evolution.

Dr. Rohl earned a PhD in biochemistry from Stanford University in the laboratory of Dr. Robert Baldwin, where her thesis work focused on the peptide model systems for protein folding and stability. Additionally, she did postgraduate work in the laboratories of Dr. Rachel Klevit and Dr. David Baker and the University of Washington in Seattle.

The technology fallacy: how people are the real key to digital transformation

Mike Church[1], Anh Phillips[2]

[1]Deloitte Digital, [2]Deloitte's CIO Program

Digital technologies are disrupting organizations of every size and shape, leaving managers scrambling to find a technology fix that will help their organizations compete. Anh Phillips, a senior thought leader at Deloitte, offers a perspective for surviving digital disruptions—and it's not about technology. It is about the organizational evolution required to harness the power of technology. This global perspective argues that digital disruption is primarily about people and that effective digital transformation involves changes to organizational dynamics and how work actually gets done. A myopic focus on the selection and implementation the right digital technologies is not likely to lead to success. The best way to respond to digital disruption is by accelerating changes in company culture to be more agile, risk tolerant, and experimental.

This unique perspective draws on four years of research, conducted in partnership with MIT Sloan Management Review and Deloitte, surveying more than 16,000 people and conducting interviews with managers at such companies as Walmart, Google, and Salesforce. The research introduces the concept of digital maturity—the ability to take advantage of opportunities offered by the new technology—and address the specifics of digital transformation, including cultivating a digital environment, enabling intentional collaboration, and fostering an experimental mindset. Every organization needs to understand its "digital DNA" in order to stop "doing digital" and start "being digital."

Mike Church

Managing Director, *Deloitte Digital*

Mike Church Mike is a Managing Director at Deloitte Digital where he partners with clients to navigate the complexities of technology and the human experience. A seasoned industry leader with over 23 years of experience, Mike has led business and organizational transformations across the technology, travel, media and CPG industries.

With expertise in brand strategy, digital transformation, CRM, and customer/employee-facing technology, Mike has launched successful strategic growth initiatives at companies such as Google, American Airlines, Diageo, Darden Restaurants, and Universal Studios.

Martin Leach

Vice President, R&D IT, Global Quality IT, HR IT, Enterprise Data Management & Analytics, *Alexion*

Martin Leach, PhD, has over 20 years' experience in Informatics and IT leadership in Biotech, Academia, and Pharmaceutical companies.

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Prior to The Broad Institute, he led IT in support of the research environment for Discovery & Preclinical Sciences at Merck. Finally, Dr. Leach is a Member of the Board of Directors at Smpl Bio and an advisory board member of Sierra Ventures and Canaan Partners venture companies.

Anh Phillips

Senior Manager, *Deloitte's CIO Program*

Anh Phillips is a researcher and author from Deloitte's CIO Program, where she studies the impact of emerging digital technologies on an organization's leadership, talent, and culture. She recently co-authored the book, The Technology Fallacy, based on over four years of research. Her work has been cited in leading publications such as The Wall Street Journal, MIT Sloan Management Review, Forbes, Fortune, and CIO Magazine.

Prior to becoming a researcher, Anh spent over 10 years leading business and technology teams in implementing CRM and order management solutions for clients.

Specialties include: Future of Work, Digital Business and Transformation, Digital Culture, Digital Talent and Leadership, Social Business, Thought Leadership Strategy, CRM, Order Management.

Anh has a BA in Humanities and did post-graduate studies in Comparative Literature, where she explored the intersection of technology and culture.

SESSION II: Perspectives – Computing of the Future

SESSION CHAIR: Scott Oloff

Executive Director, IT R&D and Medicine Enablement, *Boehringer-Ingelheim*

Scott Oloff, PhD, started his career as a Computational Chemist in Research where he worked for both Biogen and Boehringer Ingelheim.

His primary expertise was building and using machine learning algorithms for potency/ADMET predictions, docking, and research project support. In 2008 he took a position in Research IT within Boehringer Ingelheim overseeing data analytics and mining technologies.

Over time he has expanded into a number of IT R&D roles where he now oversees all technologies that are shared across the Research, Development, and Medicine business areas (Analytics, Chemistry tools, ELN's, Lab technologies, LIMS, Document Mgmt tools, etc.).

Scott holds a B.S. in Chemical Engineering from Clemson University and a PhD in Pharmacology from the University of North Carolina.

Accelerating drug discovery using quantum computing

Bhushan Bonde

UCB

Presentation highlights:

- quantum computers to solve classical computing limiting problems – processing power, time, energy and efficiency
- quantum computing having the potential of largest "new" technology; in the next decade, QC will be able to solve the complex problems in various technology sectors.
- quantum-safe security will play a crucial role for data encryption and secure data/internet communication
- quantum computers will accelerate drug discovery and health solutions, 3D molecular conformation and chemical structure search from all known chemical compounds
- quantum optimization will enable AI and machine learning algorithms, perform better learning while promising to achieve the performance of biological brain (Quantum Supremacy to Singularity?).

Bhushan Bonde

Head of IT Early Solutions Innovation Development, *UCB*

Bhushan Bonde, PhD, is the Head of IT Early Solutions Innovation Development at UCB.

He received a PhD in Systems Biology and Mathematical Modelling, with an interdisciplinary background of Computing, Biology and Mathematical Biology from Oxford (2006). He also had an interdisciplinary M. Tech in Bioprocess technology/Chemical Eng. (2001) and Bachelor's in Pharmacy (1998) and had been working across Industry, University and Government Research Institutes with 15 years of experience in Computational Biology.

In 2014 he joined UCB in the New Medicines IT team, currently leading the data integration, Image and 'omics'-based data management and analytics. His research interest involves biological data mining and visualization, mathematical algorithm design, High Performance Scientific Computing and simulation modelling of biological

systems. In addition, he is always looking for disruptive technologies such as next generation sequencing and post NGS target validation (e.g. ENCODE), NoSQL techniques for Data Integration (Neo4j, SAP-HANA, SciDB, MongoDB), Gene Signature based mapping for Drug repurposing and Causal Reasoning for target identification, Artificial intelligence and Machine Learning for RWE, digital/sensors data and biological imaging.

Quantum learning machine to study human disease patterns

Ulf Hengstmann

Bayer

Comparative data analysis using HPC and QC to evaluate its potential advantages in structural learning. Better understand disease evolution of patients with more than one disease. Real world evidence generation and QC.

Ulf Hengstmann

Business Partner, Medical Affairs & Pharmacovigilance, *Bayer*

Ulf Hengstmann, PhD, is addicted to Digital Transformation with 30 years of experience in Biology, Genomics, Market Intelligence, IT-Portfolio-, Product-, Program-, Project- and Line-Management!

Ulf got his PhD in microbiology and genomics at the Max-Planck-Institute for terrestrial Microbiology Marburg. After postdoc awardee his business stations were the Georg Thieme Verlag, Stuttgart and the Bertelsmann AG (Lycos Europe GmbH) before he joined Bayer in 2002.

From 2015 he has been Digital Innovation Manager, supporting Bayer's path in Digital Transformation and since 2019 he is Business Partner for Medical Affairs and Pharmacovigilance.

Current projects are Proof of Concept in quantum computing and the implementation of a non-interventional study for the mobile detection of atrial fibrillation.

When is quantum advantage/supremacy, when and how will it happen?

Christopher Savoie

CEO, *Zapata Computing*

Christopher Savoie, PhD, is the CEO of Zapata Computing, a Harvard spinout quantum computing software and algorithm company funded by The Engine, the venture firm founded by MIT to invest in tough tech. Dr. Savoie is a published scholar in medicine, biochemistry and computer science and his research and business interests over the years have focused on the intersection of machine learning, biology, and chemistry. Dr. Savoie is the original inventor of AAOSA, the A.I.-based natural language interface technology that was used to develop Apple's Siri.

Dr. Savoie has led big data analytics efforts at Nissan and has previously founded and served as CEO of technology companies that have been acquired or exited via IPO. Dr. Savoie is also a licensed attorney and serves as the current Vice Chairman of the Big Data Committee of the American Bar Association. He is a published legal expert on liability issues surrounding Artificial Intelligence, Big Data, Information Security and Data Privacy and has lectured and taught continuing legal education courses on these subjects.

Quantum-Inspired Computing Digital Annealer

Taisuke Iwai

Fujitsu Laboratories

The brief talk will provide an introduction and a technological roadmap of the Digital Annealer, which is a new digital circuit architecture inspired by quantum phenomena. Effective applications of Digital Annealer such as transportation optimization, drug discovery, and advanced radiation therapy will be presented.

Taisuke Iwai

Head, Digital Annealer Unit, *Fujitsu Laboratories*

Taisuke Iwai was appointed as the Head of Digital Annealer Unit, Fujitsu Laboratories Ltd. in April 2019. He has been leading for the past two years not only in basic technology of digital annealer, which is a new digital circuit architecture inspired by quantum phenomena, but also in development of application fields.

He joined Fujitsu Laboratories Ltd. in 1991, where he has been engaged in research and development of a wide range of hardware technologies including nano-materials, high frequency compound semiconductor devices, and high power amplifier MMICs for mobile communication.

He received his B.S. and M.S degrees in Physics from Osaka University in 1989 and 1991 respectively. He is a member of the Institute of Electrical and Electronics Engineers (IEEE).

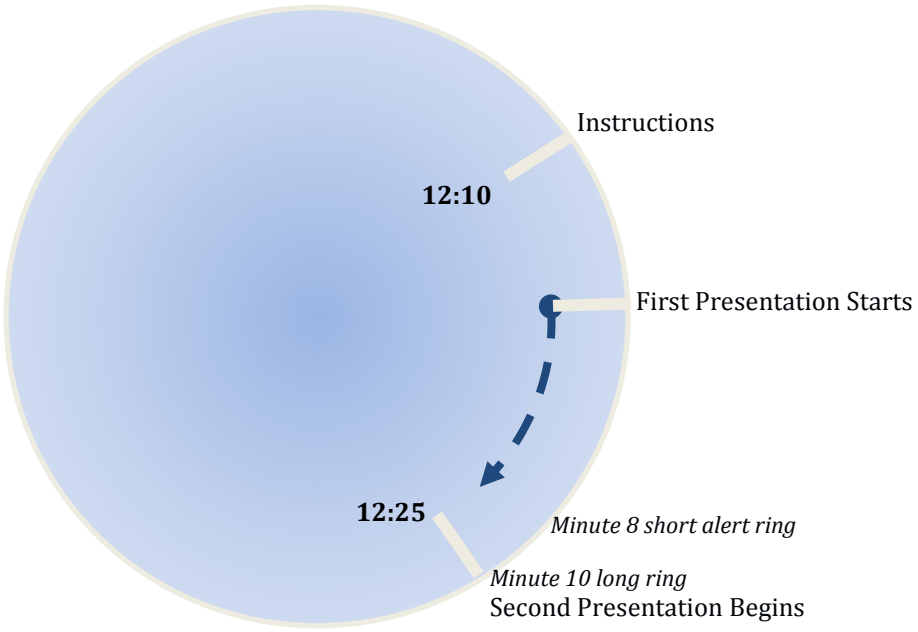
Panel Discussion (all contributors to this session)

SESSION IIIA & IIIB: POSTERS

SESSION CHAIR: Martin Leach

Martin Leach, VP R&D IT, Global Q IT, Enterprise Data Mgmt. & Analytics, *Alexion*

POSTER SESSION ROTATIONS



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

INSTRUCTIONS @12:10 pm 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 (minute 8 of each presentation and then minute 10 at which time 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".

FIRST SET OF ROTATIONS:

ROTATION 1 – 12:15 pm	ROTATION 2 – 12:25 pm	ROTATION 3 – 12:35 pm
P1 – Orange	P1 – Red	P1 – Yellow
P2 – Blue	P2 – Orange	P2 – Red
P3 – Purple	P3 – Blue	P3 – Orange
P4 – Yellow	P4 – Purple	P4 – Blue
P5 – Red	P5 – Yellow	P5 – Purple

BREAK FOR LUNCH (12:45 pm – 1:40 pm)

ROTATION 4 – 1:40 pm	ROTATION 5 – 1:50 pm
P1 – Purple	P1 – Blue
P2 – Yellow	P2 – Purple
P3 – Red	P3 – Yellow
P4 – Orange	P4 – Red
P5 – Blue	P5 – Orange

P1: Unsupervised annotation of phenotypic abnormalities via semantic latent representations on electronic health records

P1

Vibhor Gupta

Pangaea

With the increasing adoption of electronic health records (EHRs) in hospitals, phenotypic information, archived in EHRs has been found useful in clinical informatics applications. However, due to imprecise descriptions, lack of gold standards and the demand for efficiency, annotating phenotypic abnormalities on millions of EHR narratives is still challenging. Pangaea has built a novel unsupervised deep learning framework to annotate the phenotypic abnormalities from EHRs via semantic representations. The proposed framework takes the advantage of Human Phenotype Ontology (HPO), to standardize the annotation results. Experiments have been conducted on the public MIMIC-III dataset which contains 52,722 EHRs and have shown that Pangaea's framework achieves state-of-the-art performance compared with other popular methods and tools. Pangaea is extending this framework to annotate subtypes of phenotypic abnormalities in HPO and quantify the probabilistic connections between HPO and ICD codes. Besides, due to the generality of Pangaea's framework, it can be applied to annotate other biomedical concepts on medical notes if a well-established ontology is available.

Vibhor Gupta

Director and Founder, *Pangaea*

Vibhor Gupta, PhD, is the founder of Pangaea Data and has a breadth of experience in life sciences through his work in industry and academia over the last two decades.

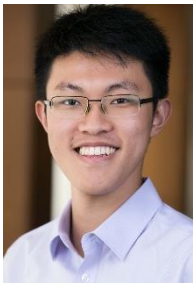
Prior to Pangaea, Vibhor started and built the European business for Quantum Secure, which was an enterprise software solutions provider headquartered in Silicon Valley and was successfully acquired by a global corporation in 2015. Following his work at Quantum Secure, Vibhor served as a Senior Vice President of Commercial Strategy and Sales at Seven Bridges Genomics, which was founded at Harvard and provided a cloud-based bioinformatics platform. Vibhor has also worked as a management and technology consultant for Deloitte.

His academic career focused on conducting molecular biology studies and building bioinformatics tools and machine learning models with epigenetic, genomic, transcriptomic and clinical trial data in the context of oncology and infectious diseases.

Vibhor has access to an extensive global network in the Life sciences industry and is regularly invited to speak at international conferences, government funded programs and investment summits.

Jingqing Zhang

Pangaea



Jingqing Zhang, MRes, was trained by Professor Yike Guo (co-founder of Pangaea) at the Department of Computing at Imperial College London. His research interest includes Natural Language Processing, Text Mining, Data Mining and Deep Learning. He received his BEng degree in Computer Science and Technology from Tsinghua University, 2016, and MRes degree with distinction in Computing from Imperial College London, 2017.

Jingqing was awarded China National Scholarship in 2015 during his undergraduate degree, which is the highest honour awarded by the Chinese government for undergraduates. Jingqing is also one of the leading contributors of TensorLayer 2.0, which is a novel TensorFlow-based deep learning and reinforcement learning library designed for researchers and engineers.

P2: Autonomous laboratory robots are here!

P2

Oskari Vinko

UniteLabs

They roam free in the laboratory corridors, supporting scientists with experiments and sample logistics while automatically documenting every step they take. When the lights switch off for the weekend, the autonomous mobile robots continue the lab operations tirelessly. They can check on your cells, take those critical time interval measurements and bring the right samples and reagents from the storage to bench when you come back to work. In this presentation, UniteLabs uncovers the potential value of autonomous robots, including typical use cases, available solutions and journey from idea to automation. They also introduce the concept of on-demand automation: a fast drag-and-drop design of workflows that are operational only for days or weeks.
This is ideal for the R&D environment where protocols evolve and projects come and go. These automation solutions evolve with your needs!

Oskari Vinko

Co-founder, *UniteLabs*

Oskari Vinko is a bioengineer and the Co-Founder at UniteLabs, a life science laboratory automation company that builds solutions that can be repurposed to new tasks.

UniteLabs has been one of the main developers of Standard in Lab Automation (SiLA 2) which is an open language to unite the way how instruments are automated and the data is captured.

Oskari's passion is also in science communication.

P3: Single platform integration of microbiome and antimicrobial resistance analytics and content

P3

Jonathan Jacobs

QIAGEN

The microbiome and microbial restistance present large potential opportunity for therapeutic interventions. One challenge is to make the analysis and interpretation of microbiome data accessible to a wider audience of researchers, including biologists and research scientists who have no background in programming and bioinformatics. QIAGEN Bioinformatics is investing in microbial genomics solutions to make data, curated content, and high-performance algorithms available on a user-friendly graphical platform that supports enterprise needs, such as data sharing, scalable cloud computing.

Jonathan Jacobs

Director, Global Product Management, Genomic Analysis, *QIAGEN*

Jonathan Jacobs, PhD, has over 19 years of experience in bioinformatics, molecular genetics, and microbial genomics. He holds a BSc. in Plant Biology from the University of Arizona's College of Agriculture, and a PhD in Molecular Genetics & Cell Biology from the University of Maryland, College Park.

Dr. Jacobs completed his training under a Postdoctoral Cancer Research Training Fellowship (CRTF) at the NIH's National Cancer Institute, where his research focused on epigenetic control of gene expression in human oncology model systems. Following his postdoc, he transitioned to industry at AstraZeneca MedImmune where he was the lead inventor on two technologies in cell line engineering that were later patented. In 2010, he joined MRIGlobal to lead a pathogen genomics group in support of a large US Government global biodefense program. While at MRIGlobal,

Dr. Jacobs led the development of systems and assays for metagenomics, microbial forensics, field-based pathogen genomics, and point-of-need diagnostics. Highlights include serving as bioinformatics lead for the U.S. Defense Threat Reduction Agency's S2S/PanGIA metagenomics diagnostics program, and developing patented technology for a field-based genomics laboratory, Mercury Lab.

Dr. Jacobs joined QIAGEN Bioinformatics in 2018 as Director of Global Product Management and is responsible for managing the development roadmap for CLC bio, the world's most widely used commercial bioinformatics software.

P4: GxP compliant data transfer of wearable device data in clinical trials: a case study in Friedreich Ataxia

P4

Ariel Dowling[1], Matthew Johnson[2]

[1]*Takeda;* [2]*APDM*

Wearable device data, such as the high-density time-series data generated by accelerometers, gyroscopes, PPG, ECG, and EMG sensors, presents a unique IT challenge for clinical trials. This high-density data can have sampling frequencies of 10-100 Hz over many hours of data collection and is usually stored using a cloud-based infrastructure. Furthermore, the vendor's proprietary algorithms access this raw data to create processed metrics, creating an additional data set that must be managed in tandem with the raw data. Transferring both the raw sensor data and the vendor processed metrics in a GCP compliant manner from the device to the sponsoring company requires careful integration of the vendor's infrastructure with the existing IT structures and systems of the sponsor. Furthermore, the vendor (Data Processor) should undertake a variety of steps to ensure that their systems meet the high standards of GCP prior to the initiation of the data collection, or the sponsor (Data Controller) assumes a higher level of risk in the trial, especially in multi-national trials.
In this poster, we present a case study of integrating the APDM gait and balance system into a clinical trial for Friedreich Ataxia (FA) at Takeda Pharmaceuticals. We will discuss the reasons why APDM was included in the trial, the challenges of transferring the data, and the insights gleaned from this wearable device.

Ariel Dowling

Assoc. Director of Digital Clinical Devices, *Takeda*

Ariel Dowling, PhD, is an Associate Director of Digital Clinical Devices within the Data Sciences Institute at Takeda Pharmaceuticals. In this role, Ariel oversees the assessment and deployment of digital clinical devices and platforms in clinical studies and related activities across the organization.

Prior to joining Takeda, she was a Senior Clinical Data Scientist at Biogen Inc where she oversaw the analysis of data from wearable sensors deployed in drug development clinical trials for Parkinson's disease. She also developed digital sensor implementation protocols, risk mitigation strategies, and data analysis plans for devices deployed across the company in Phase I and II clinical trials. Prior to Biogen, Ariel was the algorithm team lead at MC10 Inc, where she oversaw the development and implementation of algorithms across the full product line and managed all aspects of algorithm testing that lead to a successful FDA submission. She has also worked as a senior research scientist at BioSensics LLC, where she designed algorithms to analyze digital device data from Huntington's disease patients, stroke patients, and wheelchair users. Ariel holds an MS and PhD in Mechanical Engineering from Stanford University and a BE in Mechanical Engineering from Dartmouth College. She was also a post-doctoral research fellow at the Technion-Israel Institute of Technology.

Matthew Johnson

GM, Chief Commercial Officer, *APDM*

Matthew Johnson is a digital health executive focused on accelerating clinical trials by introducing a new generation of biomarkers and validated endpoints. His strategic interests are in neuroscience and aging, which are both set to accelerate over the next decade related to an increased demand for objective digital biomarkers in clinical trials and at-home monitoring for drug effectiveness and patient safety.

Matt and his partners at APDM Wearable Technologies have grown their business over the past decade to being recognized as the gold standard for measuring movement in clinical research and trials, an area of rapid growth. APDM has over 150 validated outcome measures of gait, balance, and coordination being used in multi-jurisdictional clinical studies in PD, MS, PSP, MSA, Ataxia, and other movement disorders. APDM's team is world-class with 45,000+ citations, a global network of 1,000+ clinical researchers developing on their technology platform, and 500+ peer-reviewed publications.

APDM's Information Security Management System is designed to conform to the requirements of ISO 27001, implementing the ISO 27002 and ISO 27017 code of practice for security controls, following the implemen-tation guidance of ISO 27003, and the IS risk management framework of ISO 27005 and ISO 31000. Additionally, it considers privacy (PII) based on ISO 27018 and ISO 27701 (PIMS). The auditing program is based on ISO 19011.

P5: Personalized health solutions case study: myPKFiT

P5

Jennifer Craig Cordova

Takeda

Jennifer Craig Cordova

Jennifer Cordova, Global Head: R&D Connected & Software Medical Device, *Takeda*

Jen Craig Cordova, MA, has 20 years' experience in technical transformation. Ms. Cordova is currently the Head of Connected & Software Devices within Takeda's Medical Devices Center of Excellence, R&D.

Her responsibilities include driving the thought leadership and the execution of software and device products to commercial launch. She supports the following device products and assets: diagnostics, standalone solutions, "smart" drug administration products, and platforms that enable the integration of data amongst products and between solutions within the care network. Ms. Cordova has a strong compliance background. She has championed a dedicated Takeda Software as Medical Device Quality Management System and has operational site responsibilities for maintaining Takeda's ISO:13485/MDSAP for software medical devices.

Ms. Cordova encourages strong communication and collaboration across cross-functional disciplinary teams to drive results. Her passion is in delivering commercial products that meet the increasing expectations of our eHealth consumers.

SESSION IV: PRESENTATIONS

Session Chair: Susan Stephens

Senior Director, Analytics & Master Data Architecture, *Pfizer*

Susie Stephens, PhD, is a strategic leader in the pharmaceutical industry with over two decades of experience in informatics, science and technology.

She is currently Senior Director, Analytics and Master Data Architecture at Pfizer.

Prior to that she was Head of In Silico Immunology at Johnson & Johnson for the Immunology Therapeutic Area. She has also worked at Oracle and Sun Microsystems where she had roles spanning pre-sales, product management and business development. Susie has a PhD in Physiology; post-doctoral experience in Molecular Biology; and is an alumnus of Harvard Business School.

Susie has over 20 peer reviewed papers and has presented at many industry conferences on data, advance analytics, precision medicine, and innovation. She is the founding Chair of the PRISME Forum.

Digital Health Investing: Boehringer Ingelheim Venture Fund

Debbie Lin

Boehringer Ingelheim Venture Fund|Digital Health

Dr. Lin will be presenting Boehringer Ingelheim's strategy for investing in digital health, its focus areas and examples of investments.

Debbie Lin

Debbie Lin, Executive Director, *Boehringer Ingelheim Venture Fund | Digital Health*

Debbie Lin, PhD, is Executive Director at Boehringer Ingelheim Venture Fund in the US and leads the Fund's North American efforts in Digital Healthcare. She joined Boehringer Ingelheim Pharmaceuticals in 2008.

Within Boehringer Ingelheim Pharma, she worked across various regions and divisions. She has worked in Medical Affairs in the area of women's health and later in Health Economics and Outcomes supporting all commercial product sales with large payers and providers accounts on the West Coast. She also led the US organization's social entrepreneurship program in Boehringer Ingelheim's Making More Health collaboration with Ashoka.

In 2013, she transitioned to Corporate Headquarters in Germany in Corporate Strategy and Development as Director of Corporate Development. There she was responsible for BI's global development strategy, leading BI's global venture into stroke rehabilitation. She led multi-country teams to set up the company's first stroke rehabilitation centers in Shanghai, China and in Lisbon, Portugal.

Prior to Boehringer Ingelheim, she worked as a Public Policy Consultant for Pacific Health Policy Group supporting Medicaid Policy implementation in various states such as Vermont and West Virginia during the Clinton Administration.

Her doctorate is in Pharmacogenomics and Bioinformatics from UCSF, she also has a Masters in Engineering from Stanford University and a Masters in Public Policy from UCLA.

An overview of the evolution of integrative informatics, Big Data, and AI in the life sciences with specific case studies and examples over the years and latest applications of AI/genomics in the area of rare-disease diagnosis

John Reynders

Alexion Pharmaceuticals

An overview of the evolution of integrative informatics, Big Data, and AI in the life sciences - with specific case studies and examples over the years - with latest applications of AI/genomics in the area of rare-disease diagnosis.

John Reynders

Vice President, Data Sciences, Genomics, and Bioinformatics, *Alexion*

John Reynders, PhD, MBA, is Vice President, Data Sciences, Genomics, and Bioinformatics at Alexion. In his role, Dr. Reynders leads Alexion's Data Sciences, Genomics, and Bioinformatics (DGB) organization in the design, building, and deployment of DGB solutions spanning R&D, Commercial, Strategy, and Business Development. These solutions include a graph-database of the entire rare-disease landscape annotated with prevalence, severity, competitive intensity, and genetic signature; a genomics-based rare-disease patient prevalence platform to inform licensing/acquisition opportunities; and AI-based phenotype- and genome-driven rare-disease diagnosis decision-support systems.

In parallel to his DGB responsibilities at Alexion, Dr. Reynders also led the R&D strategy, portfolio and project management department, leading efforts across R&D capability strategy, pipeline project management, portfolio optimization, governance, and R&D operating models. Prior to joining Alexion, Dr. Reynders served as CIO of Moderna Therapeutics, where he created a fully cloud-based biotech across all enterprise functions and developed informatics solutions to enable the design of messenger RNA therapeutics. Previously, John served as Vice President of R&D Information at AstraZeneca R&D leading teams in the US, UK, Sweden, Russia, Japan, and China to enable discovery, translational, clinical, pharmaceutical development, and regulatory functions. Before this, John served in leadership roles at Johnson & Johnson including VP Integrative Neuroscience and Biomarkers, Head of Informatics, and VP R&D Information Technology. Previously, John served as Information Officer with Lilly Research Laboratories, VP of Informatics at Celera Genomics, and held roles as Director and Program Manager at the Los Alamos National Laboratory.

Dr. Reynders received a Bachelors, Summa Cum Laude, in Mathematics from Rensselaer Polytechnic Institute, a PhD in Applied and Computational Mathematics from Princeton University, and a Masters of Business Administration from the Northwestern University Kellogg School of Management.

SESSION V: PRESENTATIONS

Chair: Tomoyuki Matsunaga

Head of Research Management Systems, Research IT, *Takeda*

Tomoyuki Matsunaga is Head of Research Management Systems in Global Information Technology at Takeda Pharmaceutical Company. His role is to lead any strategic IT operations for common management processes and workflows of research activities in conjunction with other functional research IT groups, such as Discovery, Preclinical and Translational Sciences. He is also the site IT manager at Shonan Research Center in Japan.

Mr. Matsunaga started his career in Central Research of Pfizer Japan in 1991 as a research scientist. After 5 years in Natural Product Screening department, he moved to Research IT group in the company and worked on various projects of global discovery research information systems. He joined Takeda in 2008 as an Associate Director in Research IT, and took the current position in 2014.

He obtained his MBA from Kenichi Ohmae Graduate School of Business and MSc, Medical Sciences from University of Tsukuba.

Multi-disciplinary computational urban sciences research in emerging data driven applications

Jibonananda Sanyal

Oak Ridge National Laboratory

The Computational Urban Sciences Group is comprised of a multi-disciplinary set of scientists carrying out applied research at the intersection of computing and complex urban systems in the emerging environment of smart cities, energy infrastructures, a modernizing electric grid, smarter and sustainable mobility, responsive buildings, water and its nexus with energy, changing impacts of severe weather and climate, data driven emergency response, and resiliency. The advances are enabled by the growing body of technologies that includes big-data, edge computing, high-performance computing, modeling and simulation, machine learning, and visualization. The talk will focus on recent data-driven computational insights generated from a growing body of deployed sensors in buildings, along roads, in vehicles, on mobile devices, and across various scales from city blocks, to regional and national scales. Most of these applications are driven by advances in modeling and simulation, sensors and controls, edge and fog computing, AI, smart mobility, and smart grids. The talk will discuss the IP pipeline of the development of new insights, late stage R&D, novel methods and algorithms, and transitioning them into tangible solutions such as research prototypes, operational tools, and data capabilities for technology uptake and/or commercialization.

Jibonananda (Jibo) Sanyal

Group Leader and Senior Scientist, *Oak Ridge National Laboratory*

Recently named one of Knoxville's 40 under 40**, Jibonananda (Jibo) Sanyal, PhD,** serves as the Group Leader for Oak Ridge National Laboratory's Computational Urban Sciences research group. Jibo's core expertise is at the intersection of high-performance computing, visualization, extreme scale data and analytics, modeling & simulation, AI, with applications in urban dynamics, energy, smart-grid, situational awareness, weather and flood impacts, emergency response and resiliency, building energy modeling, transportation, signals and predictive controls. Besides directing the activities of the group, Jibo leads a DOE funded Regional Mobility Project for Smart Cities which provide situational awareness, simulation, and data driven control for regional scale mobility and energy improvements for Chattanooga, TN. He also leads ORNL efforts in the Exascale Computing Initiative's Urban Environment Simulation project which couples multi-physics and multi-scale models of weather, CFD, transportation, buildings, and socio-economics. Previously, he has served as the lead in transforming the EAGLE-I capability, which is DOE's operational energy sector situational awareness tool for the nation, to be the key enabler of real-time energy sector information. He has a keen interest in science delivery, technology leadership, and sustainability.

A digital therapeutic and its R&D journey – tales from the road

Hank Wu

Luminopia

Current treatments for the neurovisual disorder amblyopia are limited in effectiveness due to low adherence and monocular viewing conditions. We tested the clinical effectiveness and adherence of an at-home digital therapeutic comprised of a virtual reality system that applies binocular therapeutic modifications to television shows or movies chosen by the patient.

In this single-arm, multicenter study, patients demonstrated clinically and statistically significant improvements in visual acuity and stereoacuity, maintaining high adherence over 12 weeks. We will discuss the lessons learned and next steps for this digital therapeutic.

Hank Wu

Hank Wu, Chief Digital Officer, *Luminopia*

Hank Wu is the Chief Digital Officer of Luminopia Health, a Cambridge startup working to improve the lives of children and families through captivating, rigorously developed digital therapeutics. As serial entrepreneur and advisory board member in the Boston, Taipei and Jerusalem digital health communities, Hank's startup highlights include advanced analytics for electronic health records, monoclonal microbial biotech and multi-sided healthcare platforms.

Previously, Hank led digital strategy and innovation at Biogen, where he worked on digital biomarkers using computer vision, machine learning and wearables; created the talent development program for digital health; and put the company on the map as thought leader at Bio-IT World and AWS:reInvent.

Hank received his bachelors in Electrical Engineering and Computer Science from the University of California, Berkeley, his masters in Biotech and Business from the Johns Hopkins University and his executive education from MIT Sloan. He is a co-author of scientific publications and patents through previous work at the University of California, Berkeley, the J. Craig Venter Institute and the National Lab for Cancer Research.

SESSION VI: MEETING SUMMARY, AWARDS & RECEPTION

Session Chair: Andreas Friese
Head R&D-IT Research, *Bayer HealthCare*
Technical Meeting Chair, *PRISME Forum*