Oncology & Bioinformatics

Insights from the Industry

ONCOLOGY BIOINFORMATICS

PROVENTA INTERNATIONAL

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Introduction

There are few years in living memory as disruptive and uncertain as 2020 has been. While this is true of almost every sector, the events field has seen unprecedented change in how events are held and how operations will be conducted in the future.

Proventa International was among the companies spearheading this innovation, utilising its trademark versatility to ensure that none of its important meetings were cancelled and its mission was carried out. Moving fully online, Proventa was able to facilitate connections and host expert, sector-critical discussions that would otherwise have been missed.

Despite the unforeseen challenges 2020 brought, Proventa's meetings were as successful as always, bringing together top-tier industry experts to talk through challenges and innovations with one another, make new connections and take back brand new information to their companies. Whatever challenges the rest of the year brings, those who attended the online meetings will be able to face them fully prepared and as informed as possible.

The Future of Oncology and Bioinformatics

While not quite as affected by the recent pandemic as some areas - for example clinical trials - manufacturing is currently entering a fascinating new era of technological growth and change. The roundtables held by Proventa this year took advantage of this, discussing among other things innovations and new methods for effective downstream viral inactivation; how to succeed in digital transformation; and how COVID-19 has changed downstreaming processing in the future.

From continuous manufacturing to CGT vectors to single-use technologies, Proventa's 2020 event looked at some of the most relevant and important changes in the field today, with leading experts offering their insights and thoughts to those who were there.

This report will look at some of the highlights of the recent Oncology and BioInformatics events, but will also go further: it will explore what delegates are investing in right now, and look ahead to the next five years in the field: how oncology and bioinformatics will change as the years roll on, and how delegates are being affected by the turbulence of Covid-19.

We hope you enjoy this report, and look forward to seeing you at our events next year,

Joshua Neil, ***Editor***
Proventa International

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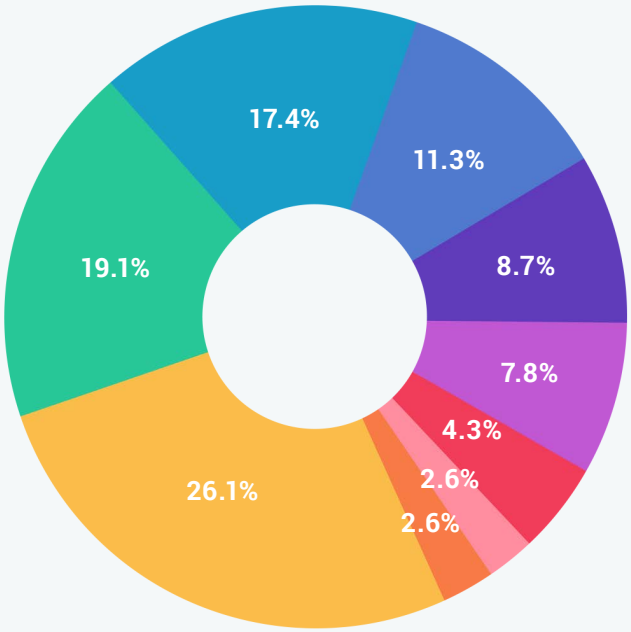


26.1% Director Level

19.1% Scientist

17.4% Department Head

11.3% C-level

8.7% Other

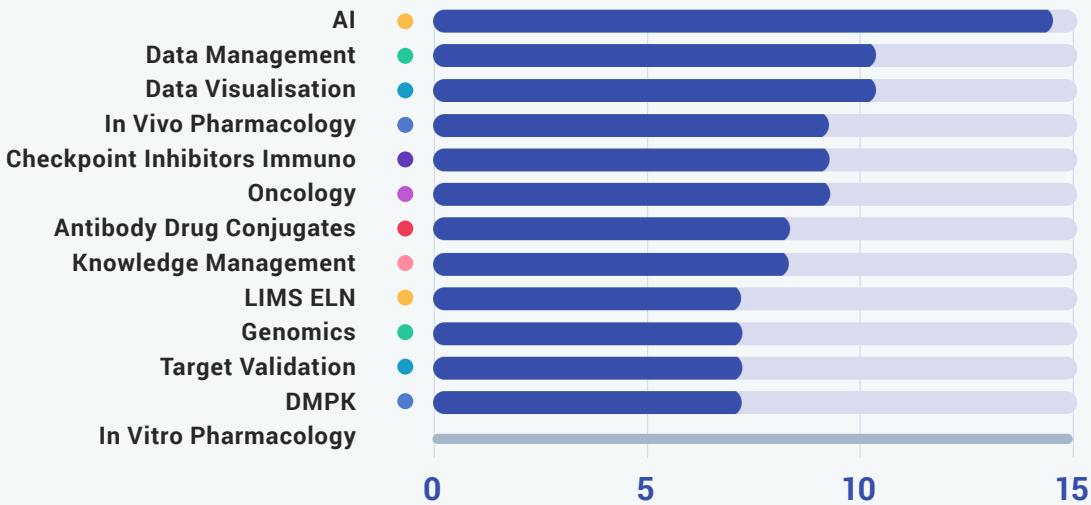
7.8% President / VP

4.3% Team Lead

2.6% Manager

2.6% Academia

Delegate Investments 2020



2020 Delegate Breakdown

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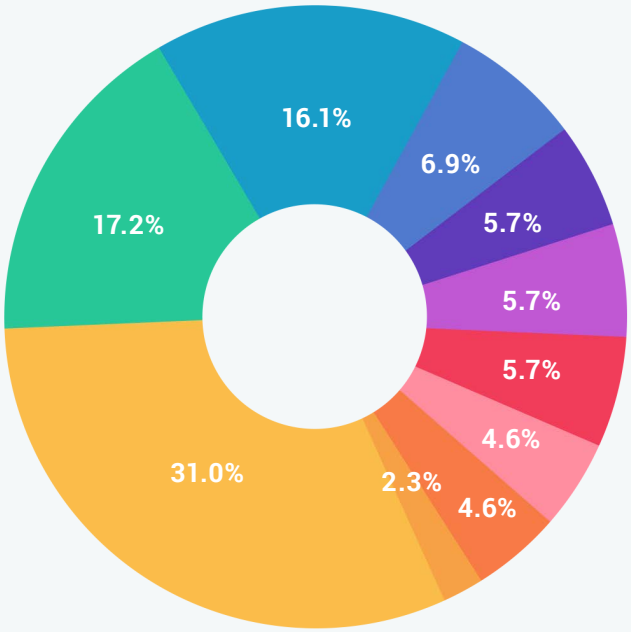
2020 Attendee Breakdown



31.0% Director Level

17.2% Department Head

16.1% Scientist

6.9% President / VP

5.7% Other

5.7% Team Lead

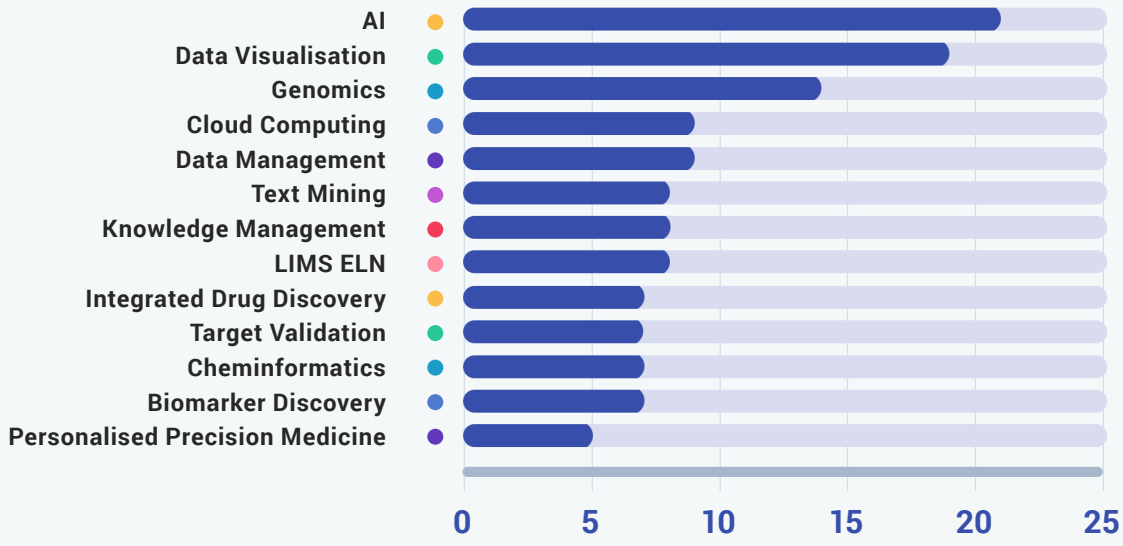
5.7% Academia

4.6% Bioinformatician

4.6% Manager

2.3% C-Level

Delegate Investments 2020



2020 Event Highlights


ONCOLOGY

Given New Innovations in IO, are Checkpoint Inhibitors a Thing of the Past?

A fascinating roundtable was facilitated during the Oncology event by Atif Abbas,
Vice President, Head of Oncology & Immunology at Spring Bank Pharma. The roundtable focused on whether checkpoint inhibitors have become obsolete with the latest innovations in immuno-oncology, and began with the note that in the last decade, IO has seen rapid development and is not recognised as a vital strategy for controlling malignant tumours' progress.

Abbas continued that cancer immunotherapies largely fall into the categories of checkpoint inhibitors, adoptive T-cell transfer, oncolytic viruses and cancer viruses, with the most promising of these including immunotherapies, immune checkpoint inhibitors (ICIs) and bispecific antibodies.

He pointed out that the IO landscape has recently achieved unprecedented growth, with sales of some antibodies racing a run-rate of $18 billion in 2018.

One delegate opened up by stating that we now have a decade of clinical data from checkpoint, and some of that interesting data comes from a combination with standard-of-care chemotherapy, which is more effective than checkpoint alone - and as such is likely here to stay for a while.

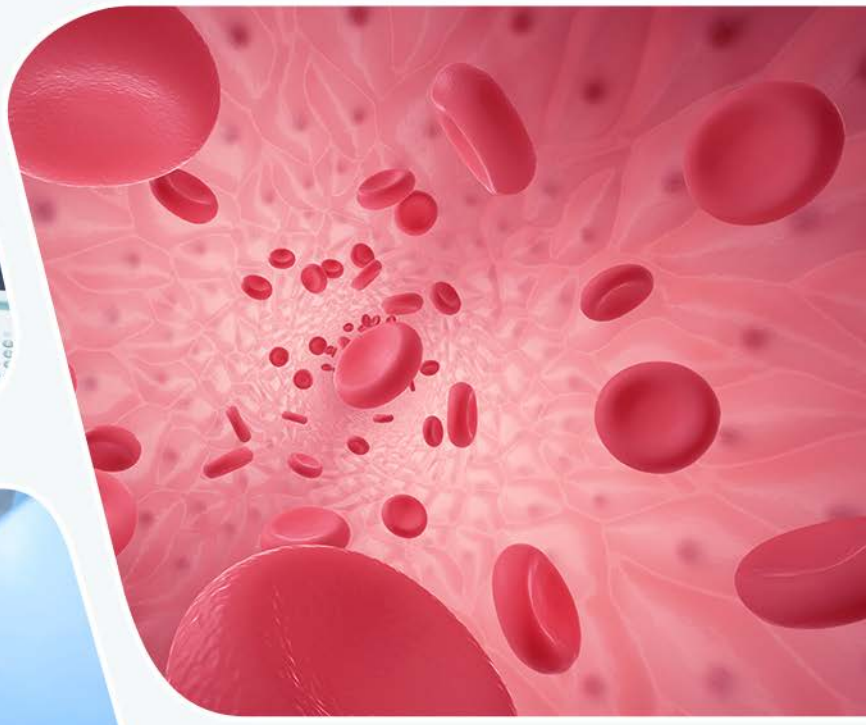
Another delegate mentioned that if you don't have single-agent efficacy, you won't get far: therefore a lot of strategies for making checkpoint inhibitors better through things like T-cell infiltration etc must show that single-agent efficacy can be achieved as well. Another expert added that this is often a must in commercial matters, as few companies wish to repeat a large phase 3 failure experiment. In turn, he said, this has driven down commercial desire for this innovation.

It was then pointed out by a few delegates that despite ICIs showing compelling clinical effectiveness in some tumour types, many patients still show de novo or adaptive resistance to the therapy.

Delegates then moved on to discuss the problems with models for checkpoint inhibitors. One noted that most were poor, with even transgenic mouse models being contrived to the point that none know how the model will translate to humans.

One expert pointed out that that even with a binary biomarker for PDL1 expression on the tumour or effector cells, one should be able to define a population that benefits from inhibition of the target - and yet even there it is unclear, and there are still patients who are PDL1 non-expressors that demonstrate in the face of checkpoint inhibition efficacy.

He said that experts could therefore take those clinical data and try to understand why an individual trial was positive or not, but there are also the various questions of who the patients on the study were, what their molecular profile was, how much evidence is there to suggest this should have worked in the first place, etc. These are all challenging.



FAIR play, FAIRification and FAIRy tales

Another excellent roundtable on the Bioinformatics event focused on FAIR principles for data, facilitated by Philippe Marc, Executive Director and Global Head of Integrated Data Sciences at Novartis Institutes for BioMedical Research (NIBR).

An initial question was posed on setting up an effective interface for efficient data mining, and which platforms could be used in the work. It was noted initially that often companies will be working with several areas of big data, and that currently it was difficult and unwise to put all the data into one place. It was advocated that each data area should be in a separate location.

The topic of metadata management was then brought up, as it is also vital early on - when data can easily be changed at scale - to ensure every entity has a unique ID which is used everywhere.

From there, the topic moved towards what these unique identifiers should be. It was mentioned that attempting to create an ID that was both highly informative and easily readable caused issues for the purposes of the metadata. Instead, it was recommended that two IDs be created per entity - one which was informative, and would most likely be a URL to give further information, and another for easy reference which could be anything at all.

A final question was also raised on accumulating lots of pieces of data. The delegate queried whether it was probable that the huge quantities of data that companies are gathering would eventually see an 'emergence' phenomena, as has been seen in other spheres such as systems biology, and create a 'big picture' that has yet to be seen.

The answer was given that there was certainly hope for this event, but that pharma companies' drive over the last ten years to push researchers into moving quickly towards human trials had limited this, as it also removed the desire for large-scale data creation and capture. However, it was noted that despite this, technological innovations such as wearables had done a lot to improve data capture, and were moving the area back in the right direction.

Key Delegate Challenges - 2020 and Beyond

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COVID-19

The greatest challenge for oncology delegates at this year's event was, unsurprisingly, COVID-19, which has affected the entirety of the pharma industry and ushered in vast changes to fundamental operations and processes. Among the specific challenges faced by oncology professionals in this area were continuing operations in the face of the coronavirus, labelling anti-COVID-19 MEMs, and ensuring a strong supply chain despite the pandemic.

Data and RWE

Another unsurprising challenge in today's climate related to data in all its aspects: This was mentioned by a wide range of delegates, citing among other things data quality and cost, keeping global data strategy close to the local needs, filling missed datapoints and FAIR data as challenges to face in the years to come.

Costs and Resources

The third most-mentioned challenge delegates are dealing with related to the numerous costs and resource challenges in day-to-day business: experts attending the online event spoke about needing to find reliable resources and lack of resource availability, the difficulties of fundraising and the problem of financing.

New Technology and AI

The need for new, innovative technologies, including AI, was also a theme for a number of those surveyed, though data was still clearly a more pressing issue. Among other things, delegates specifically mentioned the struggle of investing in the right technology, implementing AI algorithms into discovery research and working with Natural Language Processing.

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Oncology

More traditional challenges around the science of oncology itself were next on the list for many delegates. There were a wide variety of challenges mentioned within the field of oncology, but some specific difficulties involved understanding small molecule selectivity, protein activation/pathway status beside mutational data, and oncolytic viruses.

Digitalisation

Digitalising transformation was another topic on many delegates' minds. Those surveyed mentioned challenges including the need to digitalise in a short timespace with industry 4.0, the difficulty of enacting digital transformation, and problems with IT obsolescence and flexibility.

Partnerships and Outsourcing

Finding reliable third parties was a long-standing issue for many oncology experts at the event, though lower on the list than might have been expected. Experts cited challenges such as corporate development and partnership, outsourcing after COVID-19, and identifying the right CRO to work with as difficulties to be met in the coming years.

Clinical Trials

The many challenges surrounding clinical trials themselves were a more minor issue for oncology delegates. These difficulties ranged from proper design of clinical trials and ATMP trial issues to patient recruitment and retention.

Drug Discovery / Development

Another of the less frequently mentioned - but still important - difficulties facing delegates related to drug discovery and development. Among the particular problems cited, event attendees mentioned the problem of drug failures, building polypharmacological drugs, translating phenotypically active drugs in genes and drug candidate selection as big issues in their day-to-day work.

Recruitment and Staff

A final major issue cited by delegates at the event related to personnel. Delegates mentioned staffing the company, recruiting subject matter experts and reduction of manual errors as issues to be dealt with as soon as possible.

Key Delegate Challenges - 2020 and Beyond

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Data and RWE

Delegates surveyed at the bioinformatics online event gave a heavy focus on data as the greatest challenge of the near future. Among the many problems cited that have yet to be overcome, recurring issues included finding and cleaning relevant published data, metadata consistency, developing reliable genomic data integration and analysis tools, and data FAIR-ification.

New Technology and AI

The second most-cited challenge for the near future was the need for new technology and AI solutions. Among other things, delegates mentioned concerns around on-boarding new technologies, incorporating AI and machine learning into discovery research, and successfully managing current AI projects.

COVID-19

The COVID-19 pandemic, while still high on the list of challenges facing delegates,did not factor as quite so important to bioinformaticians as to those at the oncology event. Specific challenges around the pandemic included supply chain difficulties, patient recruitment during lockdown and networking during COVID-19.

Clinical Trials

Clinical trial challenges were also a significant issue for those surveyed. Specific challenges mentioned by delegates included getting access to existing clinical trial bulk RNA-seq data, proper design of clinical trials and translation of preclinical to clinical for new therapeutics.

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Target Discovery

Discovery of new targets and drugs was another issue faced by many delegates. Those surveyed mentioned target selection and validation, using deep learning to identify drug targets, and improving the efficiency and effectiveness of drug discovery.

Recruitment and Staff

The issues of recruiting and managing employees and experts was a more pressing issue to those at the bioinformatics event than those in oncology, with more delegates citing staff and training as a major challenge. Specific problems cited included recruiting postgraduate students, finding research collaborators and lacking human resources in bioinformatics.

Strategic Plans

Overarching strategic plans were another difficulty for bioinformaticians, though lower on the list than some other challenges. Delegates mentioned changes in strategic plans due to global changes, phase I clinical strategy, commercialisation strategy and ensuring a unified global data strategy as issues to combat in the coming years.

Genomics

Interesting, genomics was also a focus of many of the delegates surveyed, with several issues in the area that have yet to be overcome. Particularly, delegates mentioned challenges around genomic knowledge, integrating and analysing genetics data, and integrating genotypic and phenotypic data for disease diagnoses.

Research

Research and development was a lower issue that delegates mentioned as a challenge. Particular difficulties included incorporating AI and machine learning into discovery research, R&D in oncology and translational research difficulties.

Scale-Up

A minor challenge mentioned by delegates related to scaling work. Delegates pointed to infrastructure scale-up to meet growing needs and machine learning deployment that scales as issues to be overcome in the future.

A Look Ahead:
Oncology and Bioinformatics Over the Next 5 Years

While key investments of our leading delegates are a useful indicator of what is most important to industry professionals both now and in the immediate future, their scope and importance only extends so far ahead. To look further - to the next five years in oncology and bioinformatics, for instance - Proventa asked its facilitators about their expectations for the near future, and how the field will have changed in the run-up to 2025.

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When asked, several delegates mentioned **increased biomarker-associated therapy** as one of the most important trends in oncology. This was largely expected to increase over the next five years, as was increasing use of **immunotherapies** - which was also mentioned by several delegates as one of the most interesting new developments in the oncology field.

Beyond these two trends, **patient empowerment** was highlighted as an area the industry is strongly heading towards. Beyond these trends the physical innovations surrounding biomarker associated therapy **better use of sequencing technologies** and **enhanced access to comprehensive profiling** were mentioned in particular as being set to revolutionise the field in the next few years.

In terms of hype, **the clinical utility of ctDNA** was in particular mentioned as perhaps oversold in the oncology space: it is as yet unproven, but despite this was noted as having gained significant traction in clinical practice.

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Within bioinformatics, one of the most important trends that experts identified today revolved around **AI and machine learning**, and their ability to make predictions and learn with the data available to them. One delegate pointed out that in the future, it will be very important that these predictions become more valuable to pharma processes, and that they can clearly demonstrate their benefits.

This trend also factored into the next five years for many professionals at the event, with one noting that the focus of the sector will be more on the usage and benefits derived from the data, meaning that building ML models will take centre stage, and in turn make those models more productive.

FAIR data and improved IT solutions were another major trend of today highlighted by delegates. One expert stated that it is important to have access to the right data at the right time for decision-making, and to build the foundation for the integrated usage of data from different and diverse data sources.

As a part of this, one delegate mentioned that they were most excited about **more useful and intuitive user interfaces**, such as voice interfaces and integrated dashboards, which are set to become a focus for lab and scientific work and could enable more interactive work and faster R&D progress.

A final important trend of today was **change management**, which one delegate noted was useful for generating and integrating 'digital capabilities' into a day-to-day business.

In terms of possible overhype within bioinformatics, one delegate specified that he thought **the term 'AI' was hype**, as self-learning systems within pharma development are not applicable for the future: he said ML and the implementation of learning algorithms and models were ambitious enough for the decade to come.

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