

Omni  
Omics.ai <sup>®</sup>

Your Partner in AI-Driven Precision Medicine





**Your Partner**  
in AI-Driven Precision Medicine





Omni  
Omics.ai ®



# Vision Statement

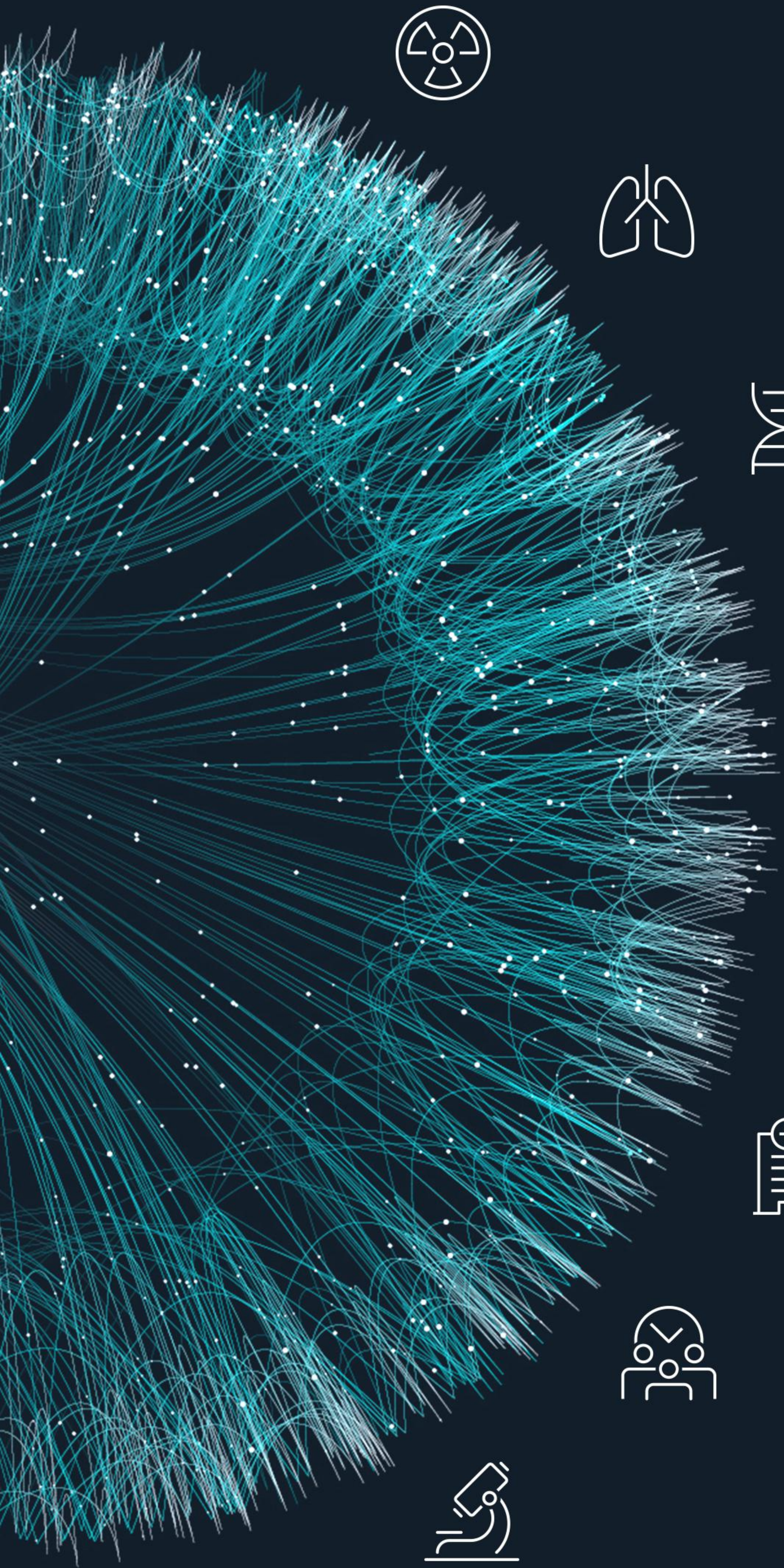


Our vision is to lead the future of healthcare by setting a new standard in integrative medicine through AI-driven multi-omics and multi-modal analyses. Our name, **OmniOmics.ai**, reflects this all-encompassing approach, integrating and analyzing various layers of biological and clinical data to create a unified understanding of human health and disease.

We envision a world where diseases are detected earlier, treatments are tailored with unparalleled accuracy, and preventive healthcare is proactive and data-informed. OmniOmics.AI strives to bridge the gap between complex biological data and real-world medical applications, ensuring that each aspect of human biology is understood and leveraged to improve global health.









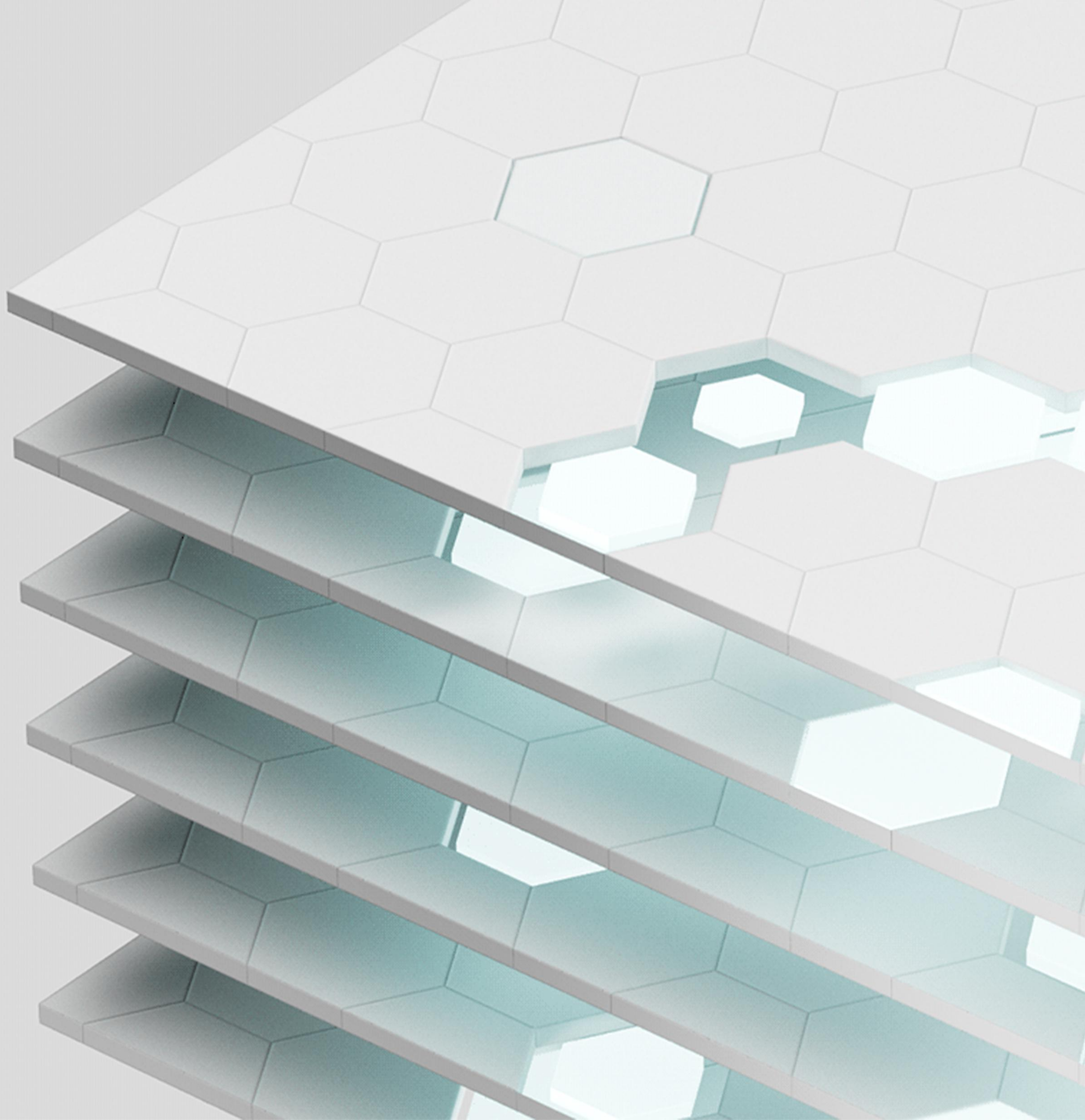
# Mission Statement



At OmniOmics.AI, our mission is to revolutionize medicine through a data-driven, comprehensive, and multi-modal approach. We are committed to harnessing the power of advanced artificial intelligence and integrating diverse data sources (spanning genomics, proteomics, metabolomics, medical imaging, clinical data, and beyond) to unlock deeper insights into human health.

Our aim is to push the boundaries of precision diagnostics, accelerate drug discovery, and empower personalized treatment strategies that transform patient care and outcomes. We understand that such an aim does not thrive in isolation and thus we closely work with a variety of clients, including academic institutes, bioinformatics companies, hospitals, clinical research organizations, pharmaceutical companies, biotechnology firms, and genomic research centers.







**Collaboration and Partnership:**

We believe in working closely with diverse partners to amplify our collective impact on healthcare and scientific advancements.

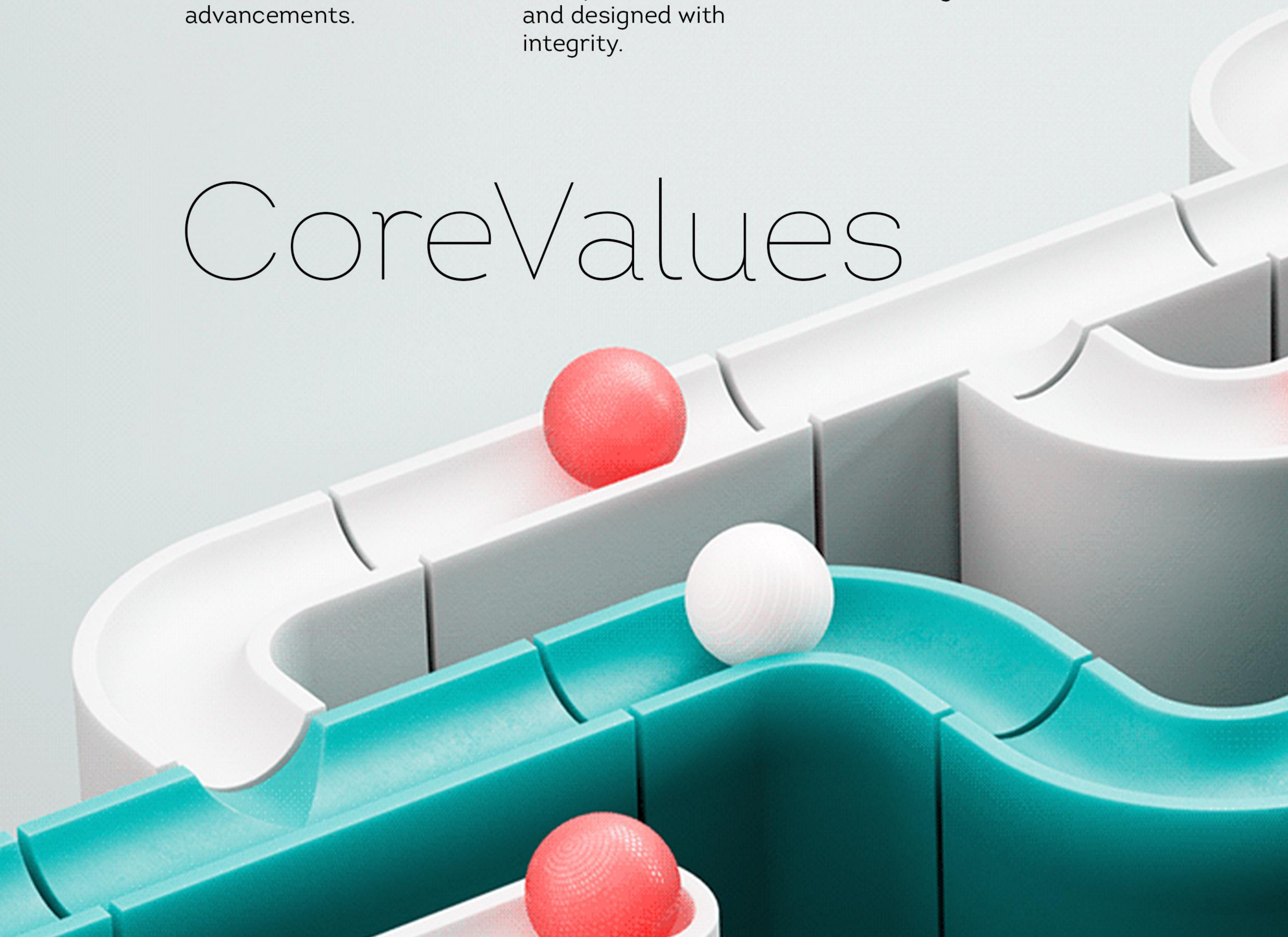
**Responsible and Trustworthy AI:**

We are committed to ethical practices, ensuring that our AI solutions are transparent, reliable, and designed with integrity.

**Innovation and Out-of-the-Box Thinking:**

We strive for creative solutions that push the boundaries of current technology and research methodologies.

# Core Values





**Excellence and Quality:**

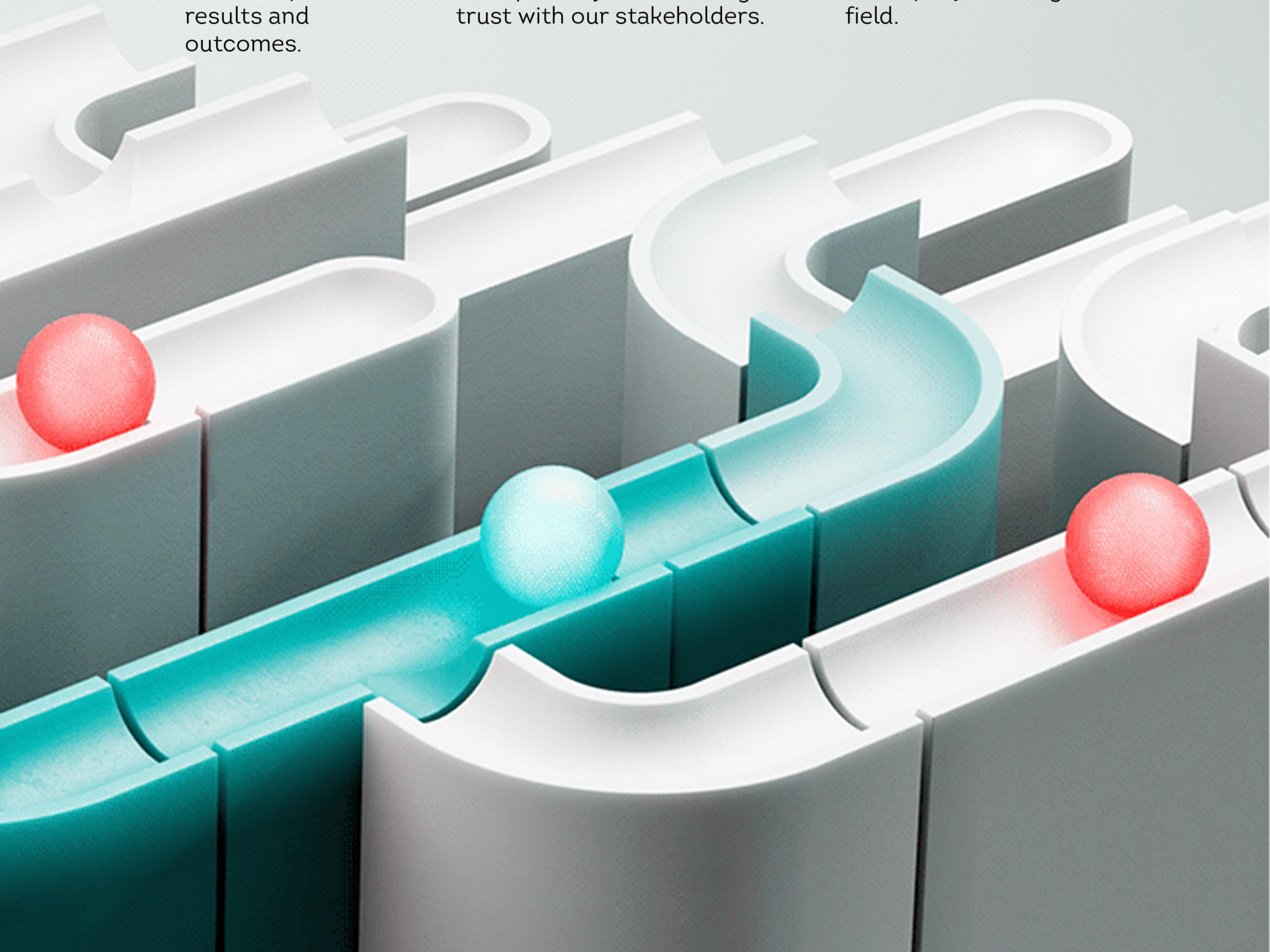
We uphold the highest standards in all our work to deliver top-tier results and outcomes.

**Integrity and Accountability:**

We uphold honesty, fairness, and the highest ethical standards, taking ownership of our actions, ensuring transparency, and building trust with our stakeholders.

**Adaptability and Continuous Learning:**

We embrace change and prioritize ongoing learning to stay ahead in a rapidly evolving field.





A close-up photograph of a sandy surface, likely a beach or dunes, showing a grid of footprints. The sand is a mix of light and dark brown tones, with the footprints creating a pattern of ridges and grooves. In the top right corner, there is a white geometric shape, possibly a corner of a page or a light source, which is partially cut off by the edge of the image. The overall composition is simple and focuses on texture and pattern.

What  
Sets Us  
Apart?



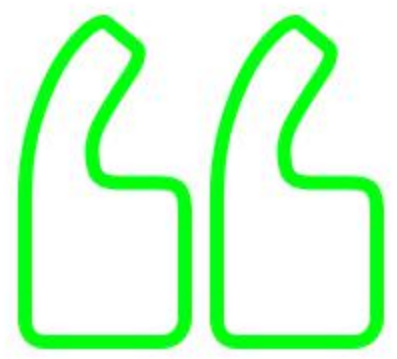




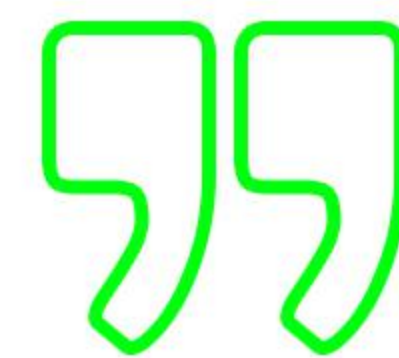


**Advanced  
AI Solutions**





Our expertise spans from traditional machine learning approaches to the latest AI advancements, including ensemble classifiers, non-linear multivariate modeling, multi-modal fusion, transformers, and large language models. We adopt a solution-focused approach, selecting and customizing methods based on their suitability for each unique problem. Our commitment to trustworthy and explainable AI ensures reliable, transparent solutions that maximize user confidence and impact.

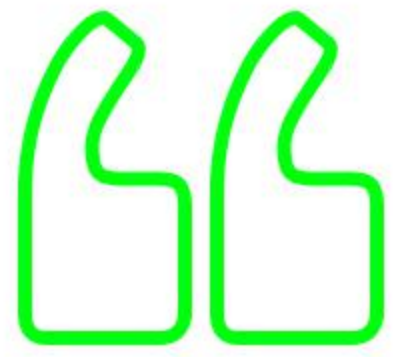




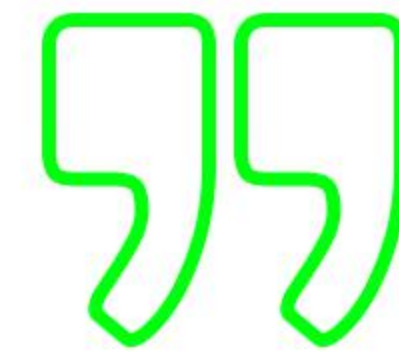


# Domain Expertise in Multi-Omics





OmniOmics.AI boasts expertise in bioinformatics and the analysis of complex multi-omics data, including genomics, proteomics, and metabolomics. This deep domain knowledge allows us to unlock comprehensive insights that drive precision diagnostics and therapeutic discoveries.

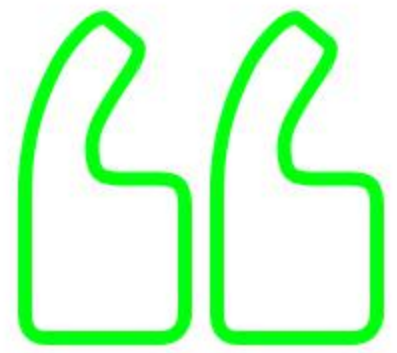




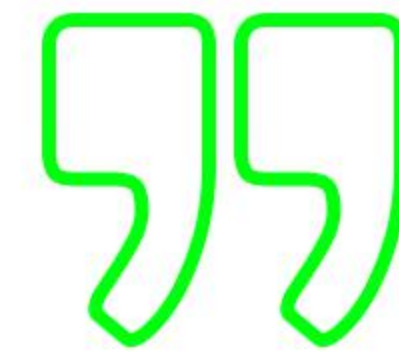


# Personalized Consulting Approach





We deliver tailored solutions that address the specific needs of our clients. Through close collaboration with academic institutions, clinical organizations, and industry leaders, we build a robust, innovative ecosystem that ensures impactful outcomes and accelerates advancements in healthcare.







# Services & Solutions





- **Multi-Omics Analytics and Multimodal AI Solutions**
- **Personalized Diagnostics and Precision Medicine**
- **Drug Repositioning and Discovery Solutions**

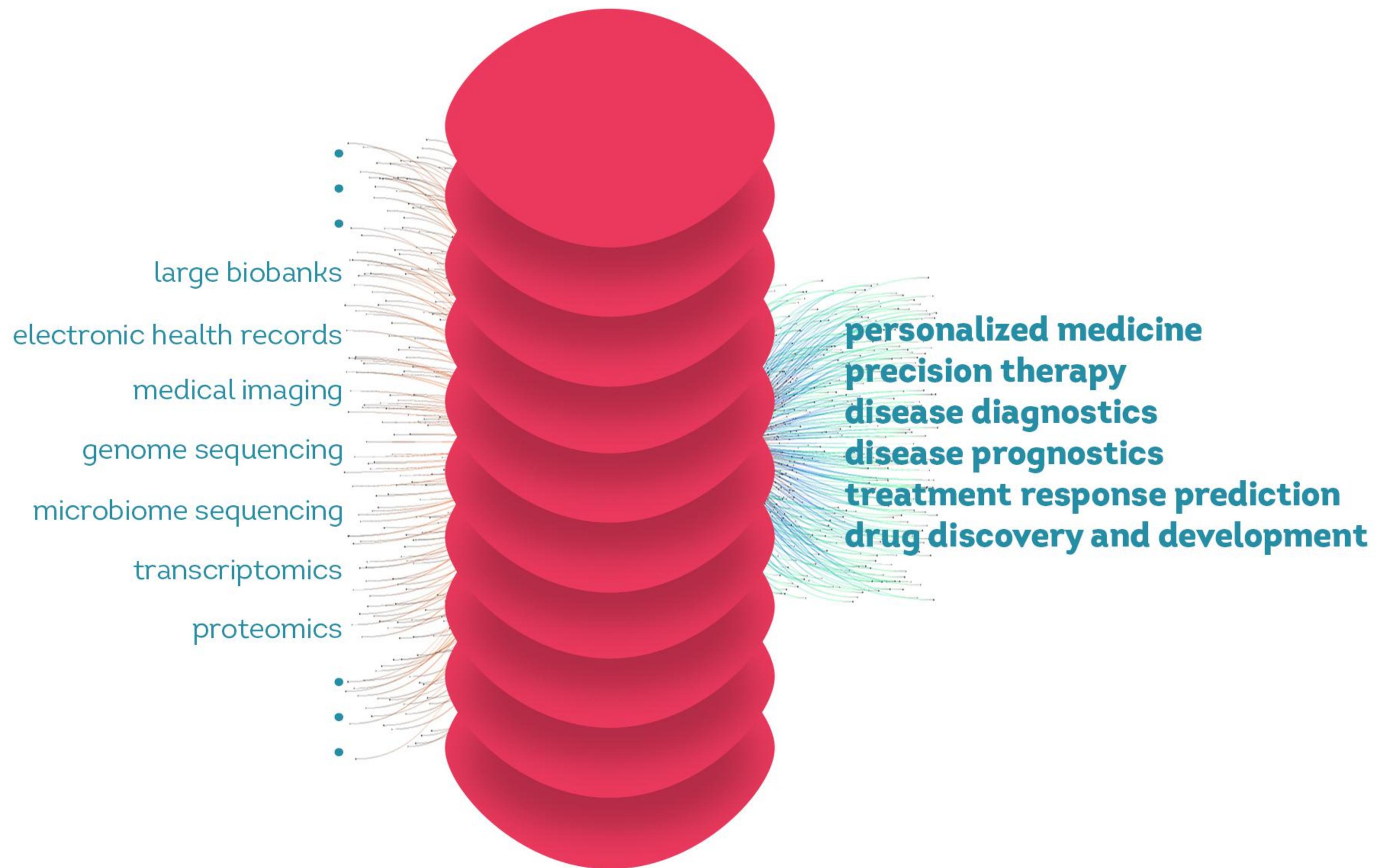


Services & Solutions |



Multi-Omics  
Analytics and  
Multimodal  
AI Solutions





Modern digital medicine is powered by a wealth of information from diverse sources, including large biobanks, electronic health records, medical imaging, and a wide variety of omics data. This data spans genome and microbiome sequencing, transcriptomics, and proteomics, derived from bulk tissues or at single-cell resolution. Together, these data sources provide a comprehensive view of the complexity of health and disease. However, this abundance of information also underscores the need for innovative tools capable of processing and integrating data from multiple sources, delivering meaningful insights across biomedical discovery, diagnosis, prognosis, treatment, prevention, and drug discovery and development.



## **AI-Driven Innovation at OmniOmics.AI**

At OmniOmics.AI, we combine cutting-edge AI with deep domain expertise to transform precision medicine and drug discovery. By integrating diverse data modalities—including multi-omics (genomics, epigenomics, metagenomics, transcriptomics, proteomics, and metabolomics), medical imaging, and text data—we develop multimodal AI systems that deliver actionable insights. Our proven track record demonstrates the ability to enhance prediction performance and generalizability by uniting these diverse data sources into robust predictive models.







The background of the slide is an abstract, flowing, wavy pattern in shades of red and pink, creating a sense of movement and depth. The waves are layered, with some appearing closer and more vibrant, while others recede into the background, creating a three-dimensional effect. The overall color palette is warm and monochromatic.

Flexible  
Explainable  
Effective

## **Our Approach**

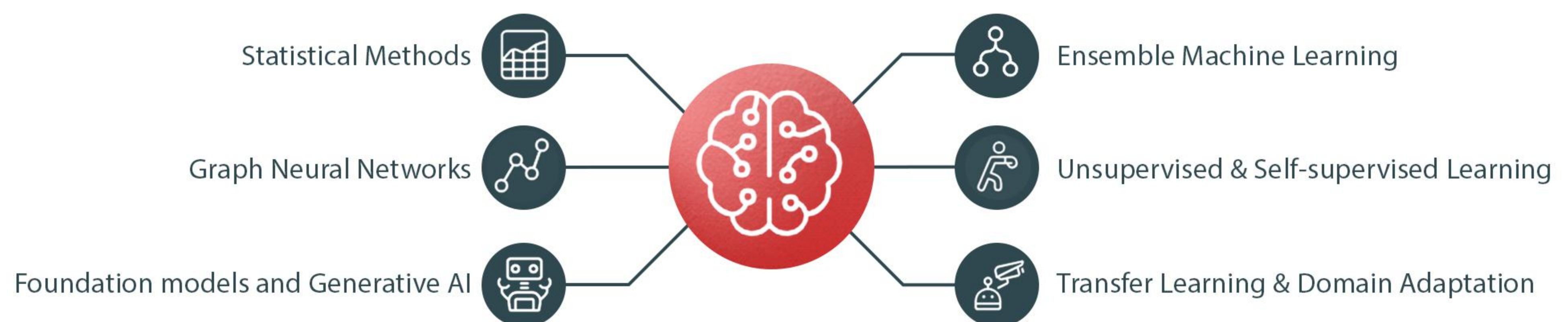
We take a **solution-driven** approach, selecting and tailoring methods based on the unique needs of each challenge.



- **Advanced Techniques:** From statistical methods and ensemble machine learning to cutting-edge graph neural networks, transfer learning, generative AI, transformers, and foundational models.

- **Explainable AI:** Ensuring decision-support systems are transparent, trustworthy, and aligned with user needs to foster confidence and understanding.

This adaptability allows us to address complex biomedical challenges effectively, offering solutions that are both innovative and practical.





## **The Power of Bioinformatics and Systems Biomedicine**

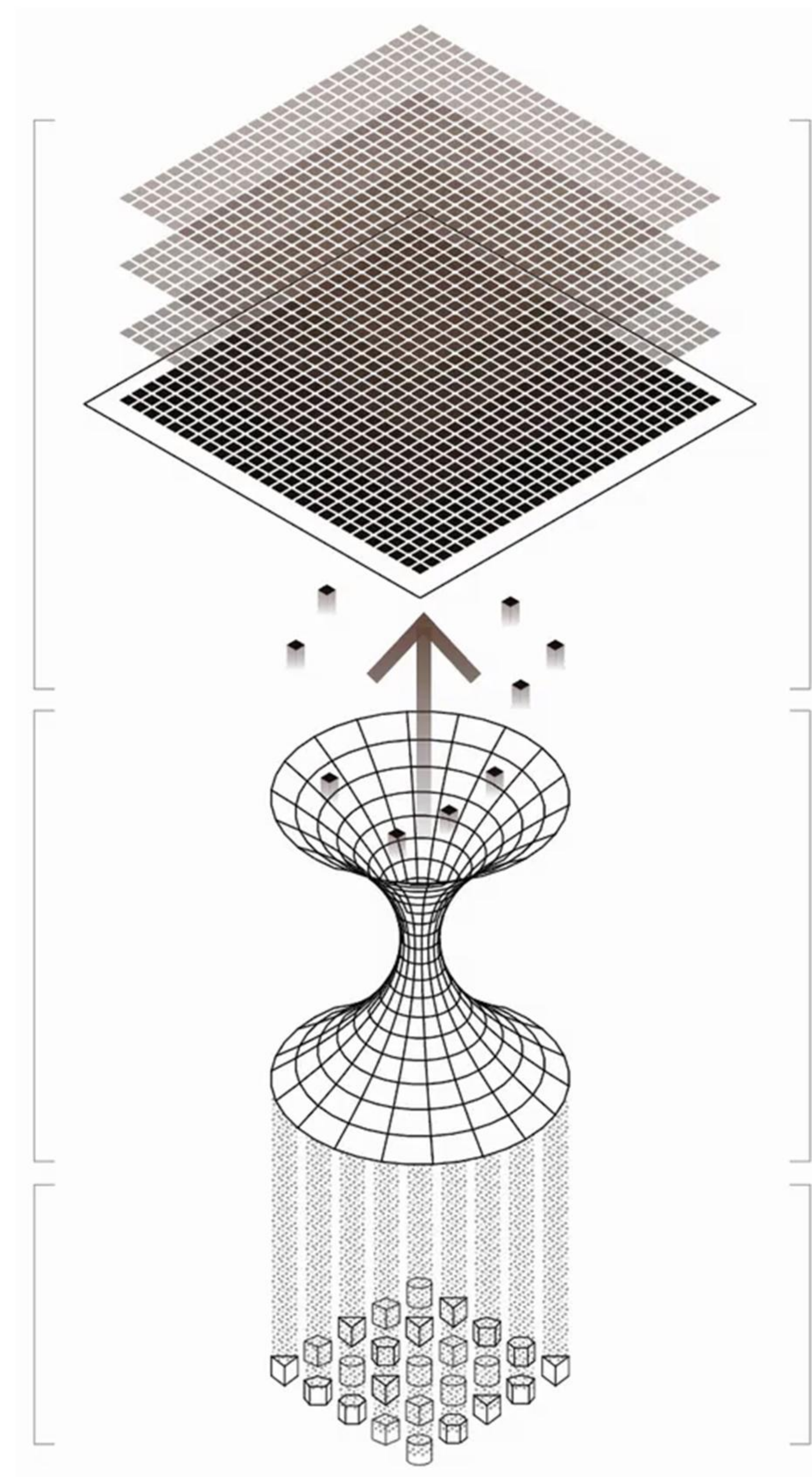
Our AI capabilities are enhanced by strong expertise in bioinformatics and systems biomedicine, ensuring comprehensive, high-quality data analysis:

- **Omics Processing:** We specialize in preprocessing, quality control, normalization, and batch correction to maximize data integrity for downstream applications.
- **Systems-Level Analysis:** Using network-based approaches, we investigate molecular relationships through signalling pathways, gene ontology, regulatory networks, and protein-protein interactions, enabling a deeper understanding of biological complexity and disease mechanisms.



## End-to-End, Scalable Solutions

To support precision medicine and drug discovery, we offer fully integrated, end-to-end solutions powered by high-performance and cloud computing platforms. From data preprocessing to model development and validation, we ensure impactful outcomes across diverse biomedical applications.





**Services & Solutions**



# Personalized Diagnostics and Precision Medicine



Advances in omics technologies, from next-generation sequencing to advanced mass spectrometry, now enable the comprehensive quantification of biomolecules from tissues, blood, and other body fluids. By measuring nearly all instances within a targeted molecular space, these technologies—spanning genomics, epigenomics, metagenomics, transcriptomics, proteomics, and metabolomics—offer holistic insights into the molecular landscape of diseases. This unbiased approach supports precision medicine by enabling biomarker discovery for early diagnosis, disease subtyping, prognosis prediction, and treatment selection.

Metagenomics  
Metabolomics  
Proteomics  
Transcriptomics  
Genomics





# Addressing Challenges in Biomarker Translation



## 1. Data Complexity:

Omics datasets are high-dimensional, noisy, and sparse, making the identification of sensitive biomarkers from small tissue samples a significant challenge.

### **Our Approach:**

Leverage AI to detect subtle phenotypic patterns within complex datasets, building nonlinear predictive models with rigorous cross-validation to maximize sensitivity, specificity, and generalizability.

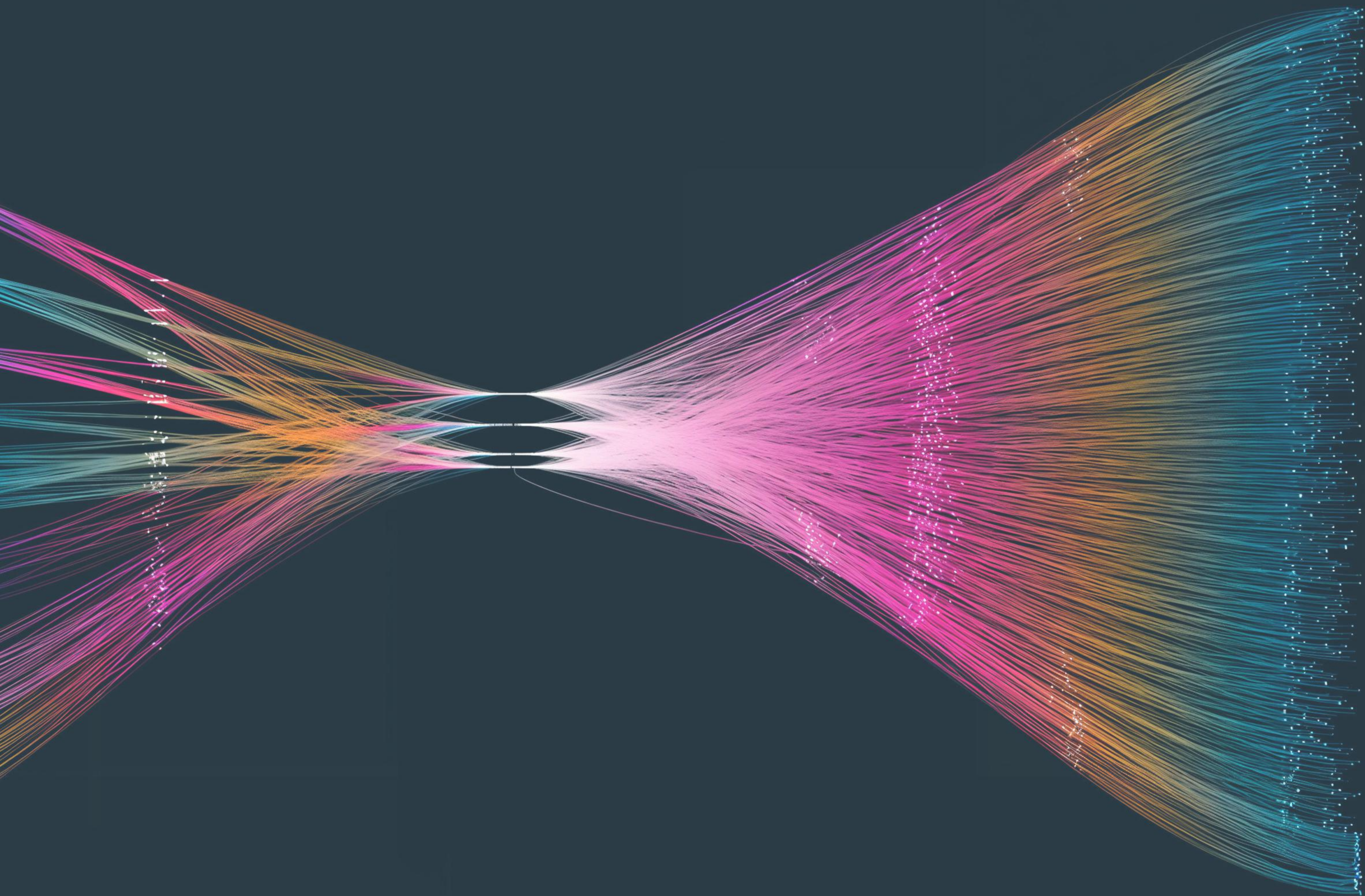
## 2. Reproducibility Issues:

Weak validation frameworks, population heterogeneity, and batch effects hinder the reproducibility of biomarkers.

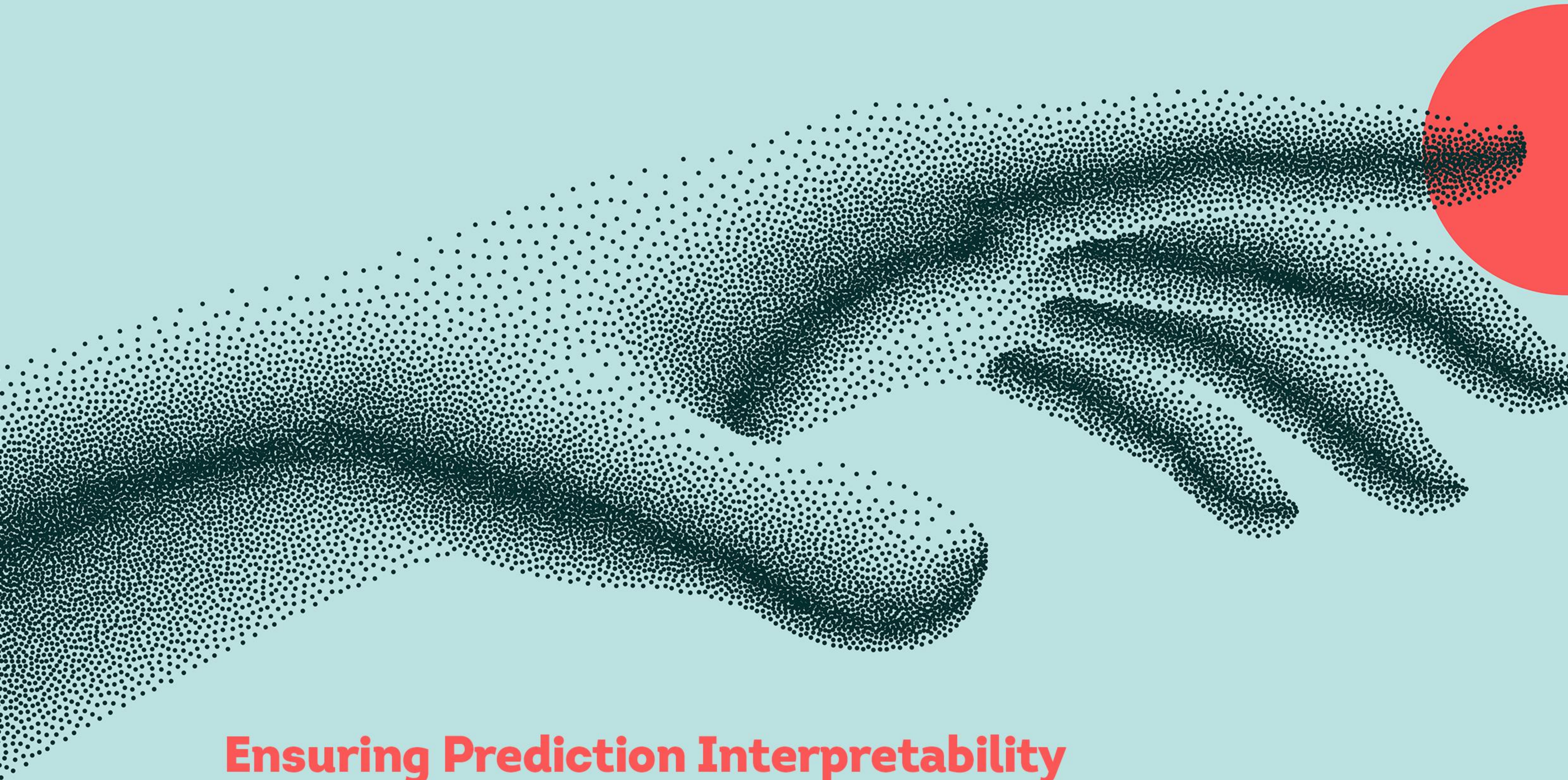
### **Our Approach:**

- Collaborating with industry and healthcare organizations to build large, diverse sample cohorts for unbiased validation.
- Develop AI transfer learning techniques to incorporate public repositories and biobank data, reducing data requirements while improving model robustness and performance.









## Ensuring Prediction Interpretability

AI adoption in diagnostics faces hurdles around trust, accountability, regulatory compliance, and patient understanding.

### **Our Approach**

- Employing explainable AI (XAI) methodologies to ensure transparency and traceability of diagnostic decisions made by AI systems.
- Designing interpretable systems that align with regulatory standards and enhance clinician and patient trust.



## Innovating with Multimodal Diagnostics

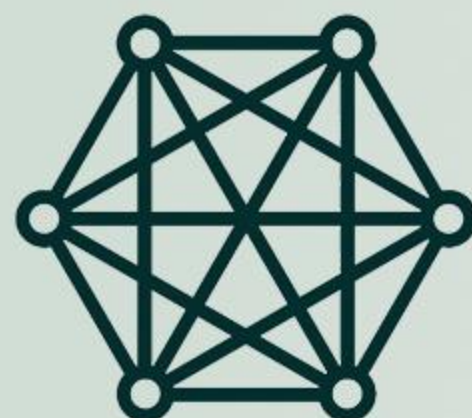
We lead efforts in developing highly sensitive and specific biomarker panels that integrate diverse molecular analytes across multiple omics modalities. These multi-analyte biomarker panels, enhanced by advanced AI, enable precise diagnostics tailored to individual patient profiles.





## Data Complexity ●

- Curse of dimensionality ( $n \ll p$ )
- Curse of sparsity
- Low signal-to-noise ratio

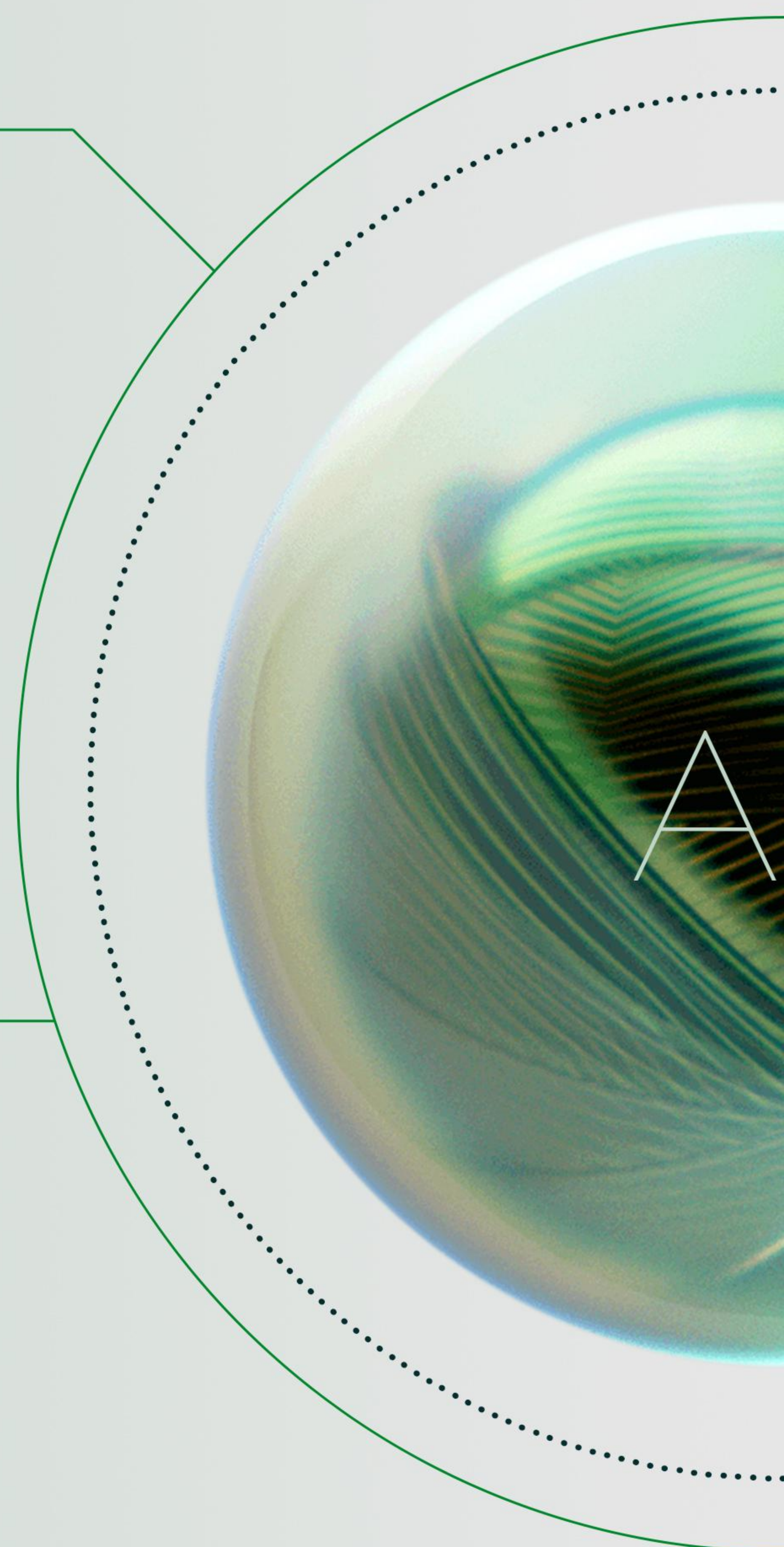


**AI** models detect subtle molecular patterns from large complex data, enabling biomarker models with high accuracy in detecting subtle signs of early-stage tumours

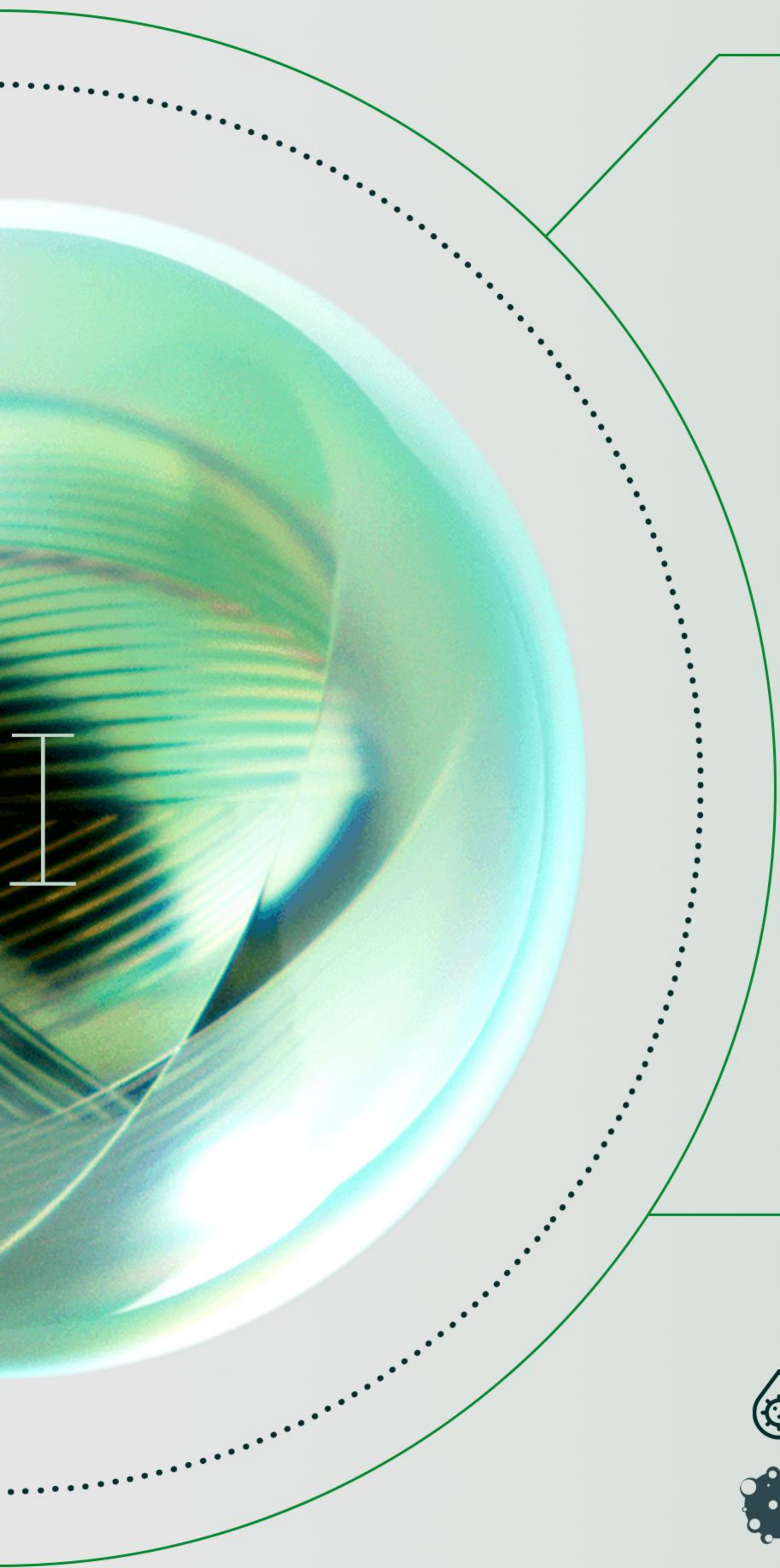
## Prediction Interpretability ●

Interpretability of diagnosis and decision-making is essential for:

- Trust and Acceptance
- Accountability
- Regulatory Compliance
- Patient Understanding







## ● Lack of Reproducibility



Identifying reproducible biomarkers is one of the biggest challenges in personalised cancer diagnosis, due to:

- Absence of standard sample processing protocols
- Weak validations
- Population heterogeneity and batch effects

**Conceptual paradigm shift:** from biomarker panels to molecular fingerprints

## ● Multimodal Diagnostics

### Multi-analyte blood test



• Platelets (RNAs)



• EV (Lipid/Protein/RNAs)



• cfDNA (Mutations)

### Multi-omics profile

- Proteomics
- Lipidomics
- Transcriptomics
- Genomics



**Services & Solutions** |

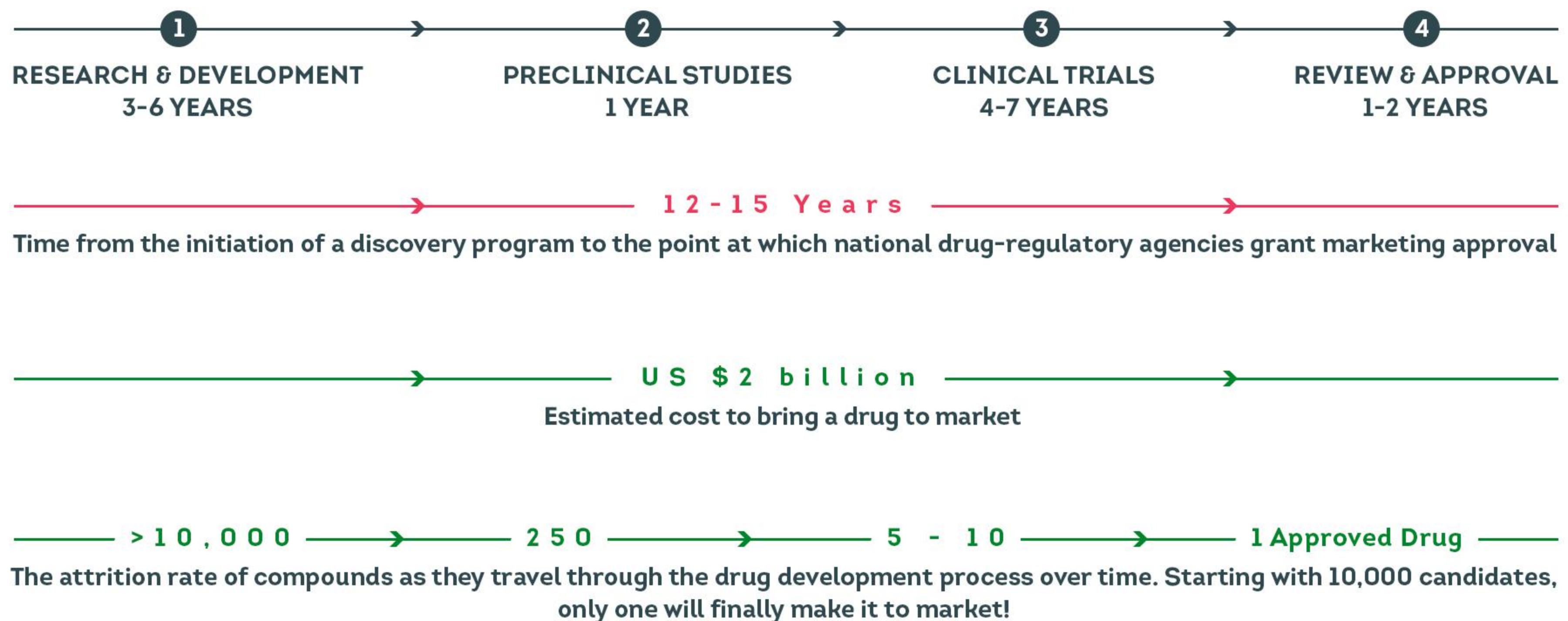


# Drug Repurposing and Discovery Solutions



Developing a new drug is a time-intensive and costly process, typically taking 12-15 years from the start of discovery to marketing approval. With an estimated cost of around \$2.5 billion per drug and a success rate of only 10% for drugs entering clinical trials, the stakes are extraordinarily high. These challenges underscore the need for innovation in drug development to reduce costs, improve efficiency, and most importantly, save lives by accelerating access to effective treatments.

Artificial intelligence (AI), particularly deep learning, is revolutionizing drug discovery. Reports by leading organizations such as BCG indicate that AI can reduce time and costs by 25-50% in preclinical drug discovery stages. By making the process faster, cheaper, and more precise, AI is becoming a cornerstone of innovation for biopharma companies worldwide.





# The Promise of Drug Repurposing

Drug repurposing—finding new applications for existing drugs or previously unsuccessful candidates—offers a transformative approach to drug development:

- **Faster Development:** Repurposed drugs often bypass early safety testing since their safety profiles are already established.
- **Higher Success Rates:** Approximately 30% of repurposed drugs reach patients, compared to only 10% for traditional development.
- **Cost-Effective Strategy:** Repositioning drugs reduces the time, cost, and risk associated with de novo drug discovery.

With advancements in high-throughput technologies and the explosion of biological and medical data, computational drug repurposing has emerged as a powerful approach to systematically identify repositioning candidates.





# Our Approach: AI-Powered Drug Discovery

At OmniOmics.AI, we leverage cutting-edge AI and vast biological datasets to streamline drug discovery and repurposing. Our integrative models combine diverse data sources to address challenges across the drug development pipeline:

- **Data Sources We Leverage:**

- Drug chemical structures and bioactivity profiles.
- Drug targets, mechanisms of action, and disease associations.
- Drug combination synergy high-throughput screening.
- Side effects, toxicity profiles, and drug-drug adverse interactions.
- Protein-protein interactions and molecular perturbations.
- Gene-disease databases and genome-wide association studies.
- Clinical trial results.

- **Key Capabilities:**

- **Drug Target Identification:** Identifying novel and high-potential drug targets.
- **Repurposing for New Indications:** Discovering innovative applications for existing drugs.
- **Toxicity Profiling and Side Effect Prediction:** Anticipating and minimizing risks.
- **Drug Synergy and Interaction Analysis:** Unveiling effective combinations and avoiding adverse interactions.
- **Enhancing Clinical Trial Success:** Understanding efficacy and toxicity to improve outcomes.

By combining AI's predictive power with rich biological data, we drive transformative advancements in drug discovery, accelerating timelines and improving the odds of success.



# OmniOmics.ai Who We Are?

OmniOmics.AI is led by **Professor Fatemeh Vafae**, a renowned AI expert and leader in computational biomedicine. With over a decade of experience in AI-integrated translational medicine and drug discovery, she has built strong partnerships with industry and healthcare organizations, driving impactful innovations.

Professor Vafae has an outstanding leadership track record, serving as the **Deputy Director** of the [UNSW Data Science Hub](#) and the [AI Institute](#) at the **University of New South Wales (UNSW Sydney)**, a university-wide center with over 300 AI researchers across diverse disciplines.

Her groundbreaking contributions have been recognized internationally. In 2023, she received the prestigious **Women in AI Asia-Pacific (WAI-APAC) Award in Health** and was the Runner-Up for **WAI-APAC Innovator of the Year**. She has been named one of the **Top 10 AI Influencers in Asia-Pacific** by AI magazine and was honoured with the **Research Excellence Award** from the Australian Bioinformatics and Computational Biology Society.





Dr. Vafae earned her PhD in Artificial Intelligence in 2011 from the **University of Illinois at Chicago**, followed by multidisciplinary fellowships in computational biomedicine at the **University of Toronto** and the **University of Sydney**. By 2025, her research and development activities have secured over **\$20M in funding**, produced more than **70 high-impact publications**, and led to the creation of **20+ software tools, patents, and medical products** currently advancing toward commercialization. Her work has also garnered widespread media attention for its innovation and societal impact.

Under her leadership, OmniOmics.AI is powered by a talented team of data scientists, bioinformaticians, and AI specialists, supported by a highly skilled commercial and business development team. For updates on our growing team, visit **[OmniOmics.ai](https://OmniOmics.ai)**.













# Publications ●●●





For an up-to-date list of publications, scan the QR code above.





Why  
Choose

**OmniOmics.ai**



# Personalized Consulting Approach

At OmniOmics.AI, we believe in building strong, collaborative partnerships tailored to the unique needs of each client. Our consulting approach is designed to ensure impactful outcomes through:

- **Client-Centric Solutions:** We take the time to understand your specific challenges and goals, tailoring our strategies and methodologies to align with your vision.
- **Diverse Collaboration:** Our partnerships span academic institutions, clinical organizations, pharmaceutical companies, and biotechnology firms, enabling shared innovation and knowledge exchange.
- **Flexibility and Adaptability:** Whether you need support in precision medicine, multi-omics analysis, or drug discovery, we offer flexible solutions customized to fit the scale and scope of your project.
- **Ongoing Support and Communication:** We provide continuous collaboration and transparent communication throughout the project lifecycle, ensuring alignment and delivering meaningful results.

Our personalized approach ensures that every collaboration leads to transformative solutions, maximizing the value of your investment in AI-driven healthcare innovation.



## Innovative Expertise

At OmniOmics.AI, we believe in building strong, collaborative partnerships tailored to the unique needs of each client. Our consulting approach is designed to ensure impactful outcomes through:

- **AI Excellence:** Expertise in diverse methods such as ensemble classifiers, graph neural networks, generative AI, transformers, and foundational models. We ensure explainable and trustworthy AI tailored to real-world applications.
- **Solution-Driven Approach:** We prioritize practical solutions over rigid methodologies, customizing or innovating approaches to meet each project's unique needs.
- **Multi-Omics Integration:** Comprehensive analysis of genomics, proteomics, metabolomics, and other omics data, combined with clinical and imaging information for holistic insights.
- **Comprehensive Pipelines:** From data preprocessing and quality control to advanced model development and validation, we offer seamless, scalable solutions.
- **Scalable Computing:** Leveraging cloud computing and HPC to ensure efficiency and scalability for projects of all sizes.



## Trusted Excellence

Our reputation as leaders in AI and precision medicine is built on a commitment to excellence and integrity:

- **Award-Winning Team:** Recognized globally for contributions to AI and computational biology, our team brings deep expertise and innovation to every project.
- **Ethical and Transparent Practices:** We prioritize responsible AI, upholding the highest standards of quality, accountability, and ethical conduct.
- **Proven Impact:** With a strong track record of delivering meaningful outcomes, we are dedicated to advancing precision medicine and therapeutic innovation.



# Call us

## Your AI Journey Starts Here!

Contact us for a consultation and discover how our AI-powered solutions can accelerate your success.

Schedule a free consultation today



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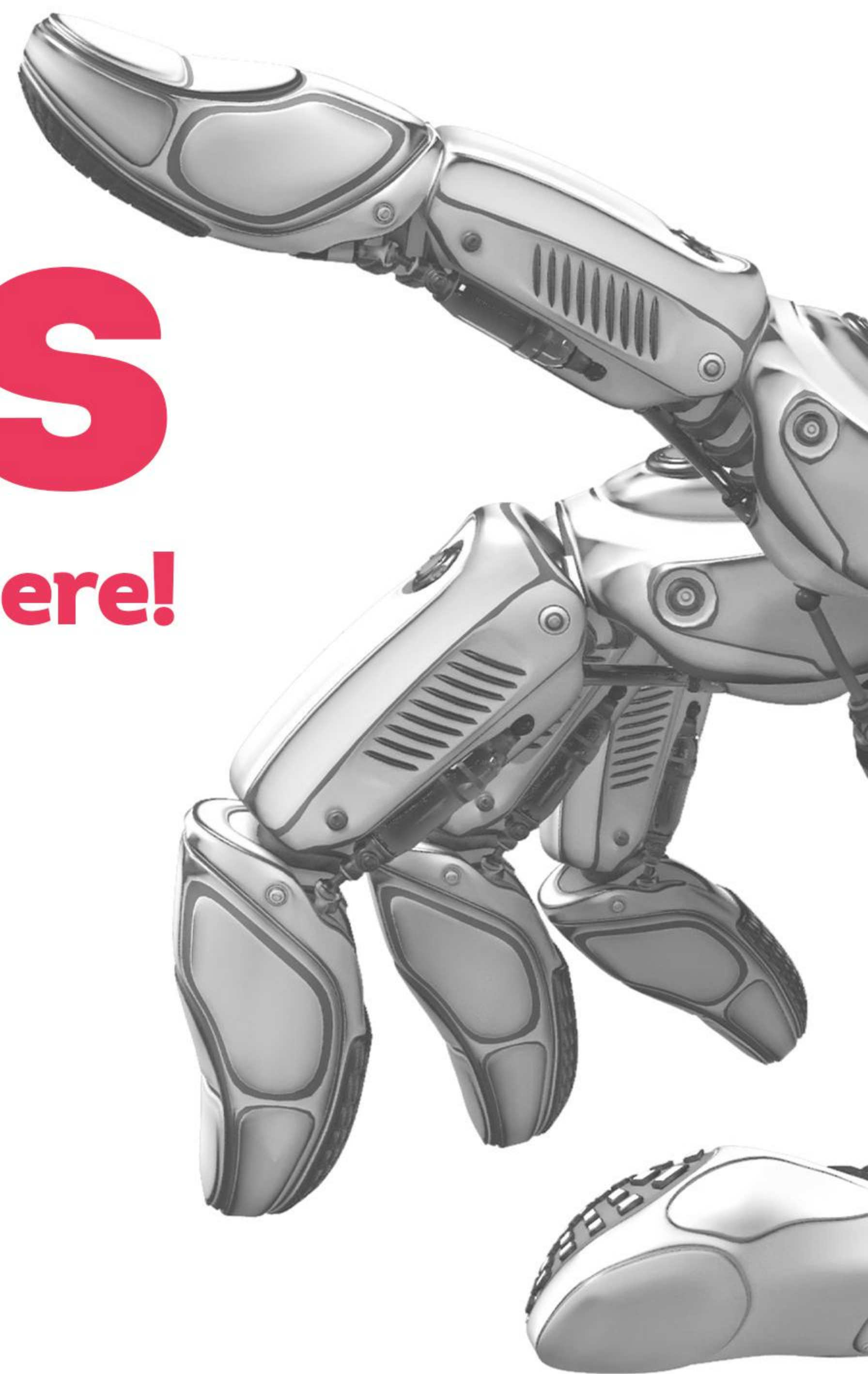
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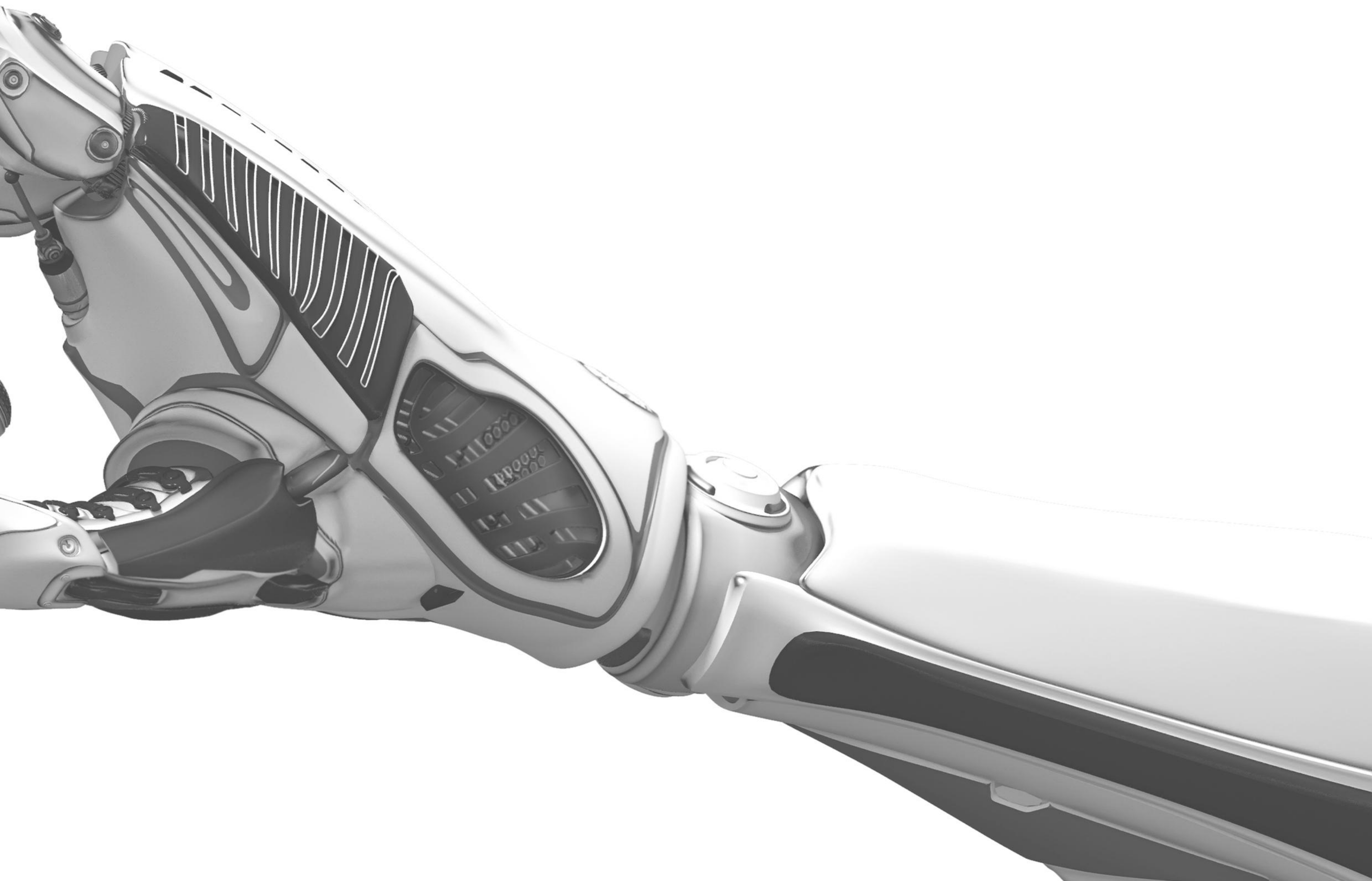
linkedin.com/company/omniomics-ai



Head Office: Sydney, 2035 Australia











YOUR PARTNER  
IN AI-DRIVEN  
PRECISION MEDICINE





Omni  
Omics.ai <sup>®</sup>



The logo for OmniOmics.ai features the word "Omni" in a white, sans-serif font above the word "Omics.ai" in a larger, white, sans-serif font. A registered trademark symbol (®) is positioned to the right of "ai". The background of the entire image is dark with intricate, glowing patterns of teal and magenta lines that resemble DNA or data paths.

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Empowering Precision Medicine with AI and Multiomics Insight