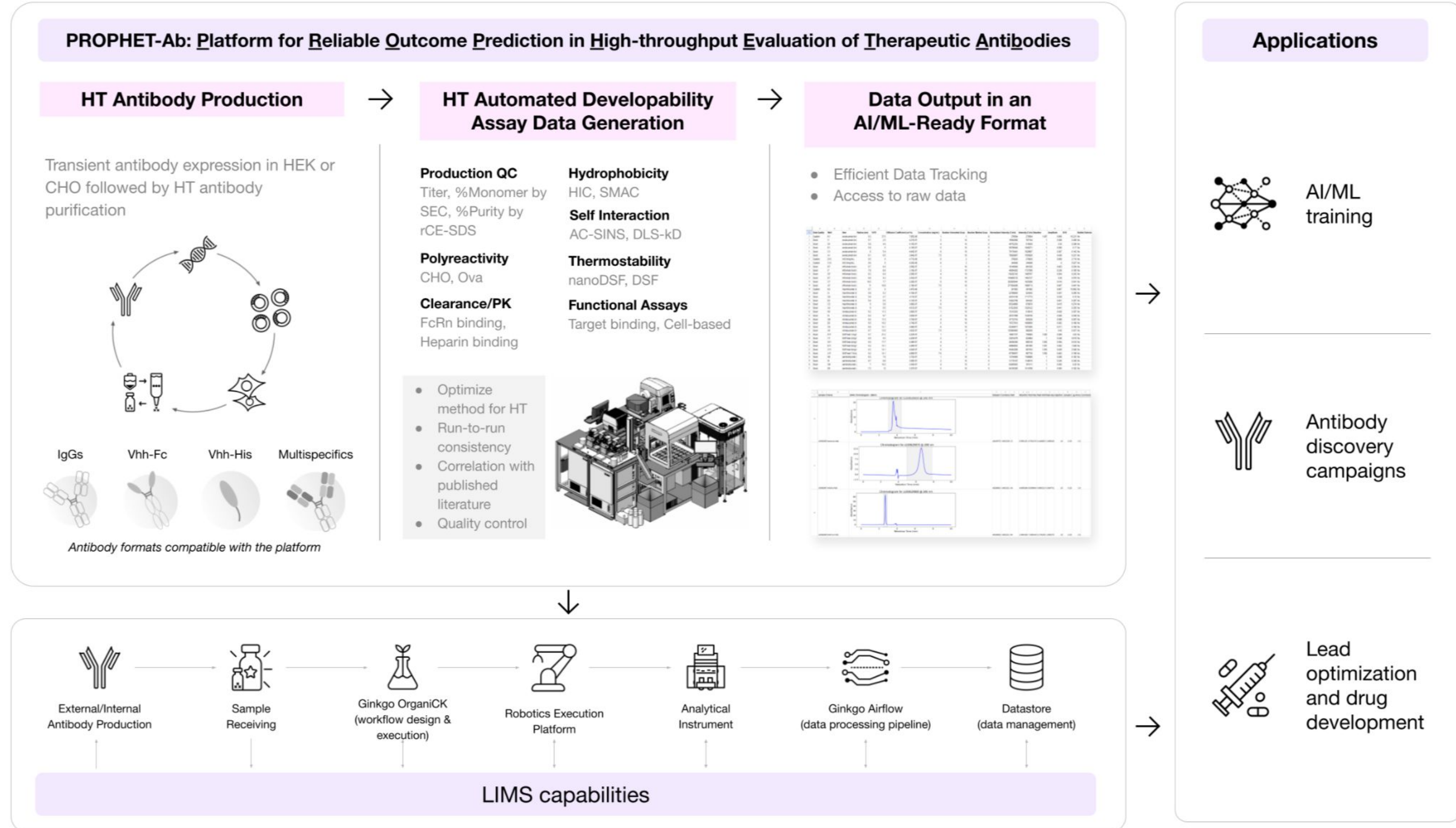


A High-Throughput Antibody Developability Data Generation Platform for AI/ML Model Training and Drug Discovery

Ammar Arsiwala, Rich Cohen, Rebecca Bhatt, Xiang Ao, Adam Rosenbaum, Aanal Bhatt, Alex Smith, Lucia Grippo, Xing Cao, Jay Patel, Olga Allen, Ali Faraj, Jason Hocking
 Ginkgo Bioworks Inc., Boston

What We Are Offering And Why It Is Important

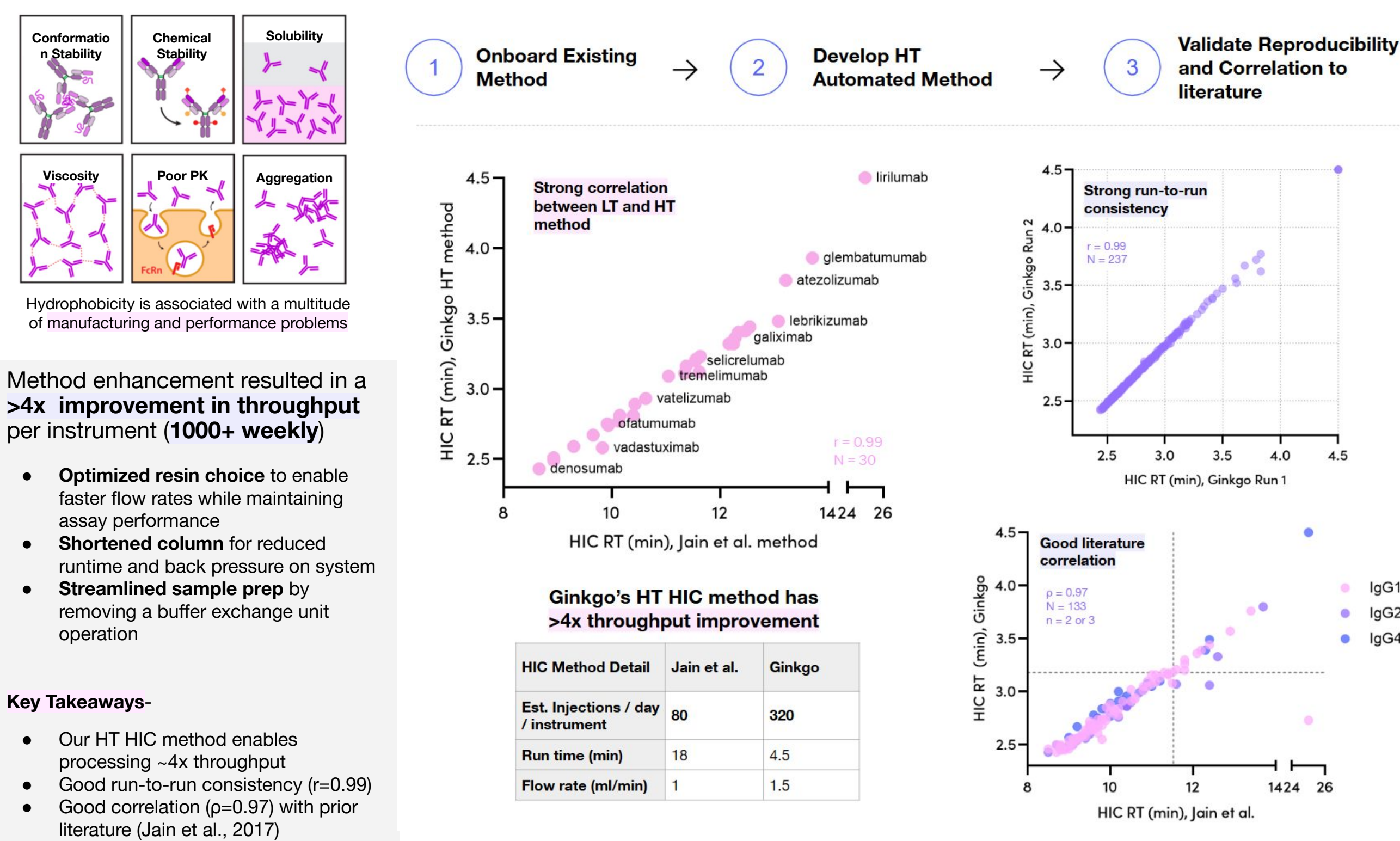


Successful antibody therapeutics require not only binding and function but also an acceptable “developability” profile, which encompasses biophysical properties essential for manufacturability, formulation, and in vivo performance. While there have been significant advances in computational modeling and high-throughput screening for binding, the **prediction of developability properties remains a challenge**. This gap is largely due to the scarcity of large-scale, high-quality datasets required to train robust machine learning (ML) models.

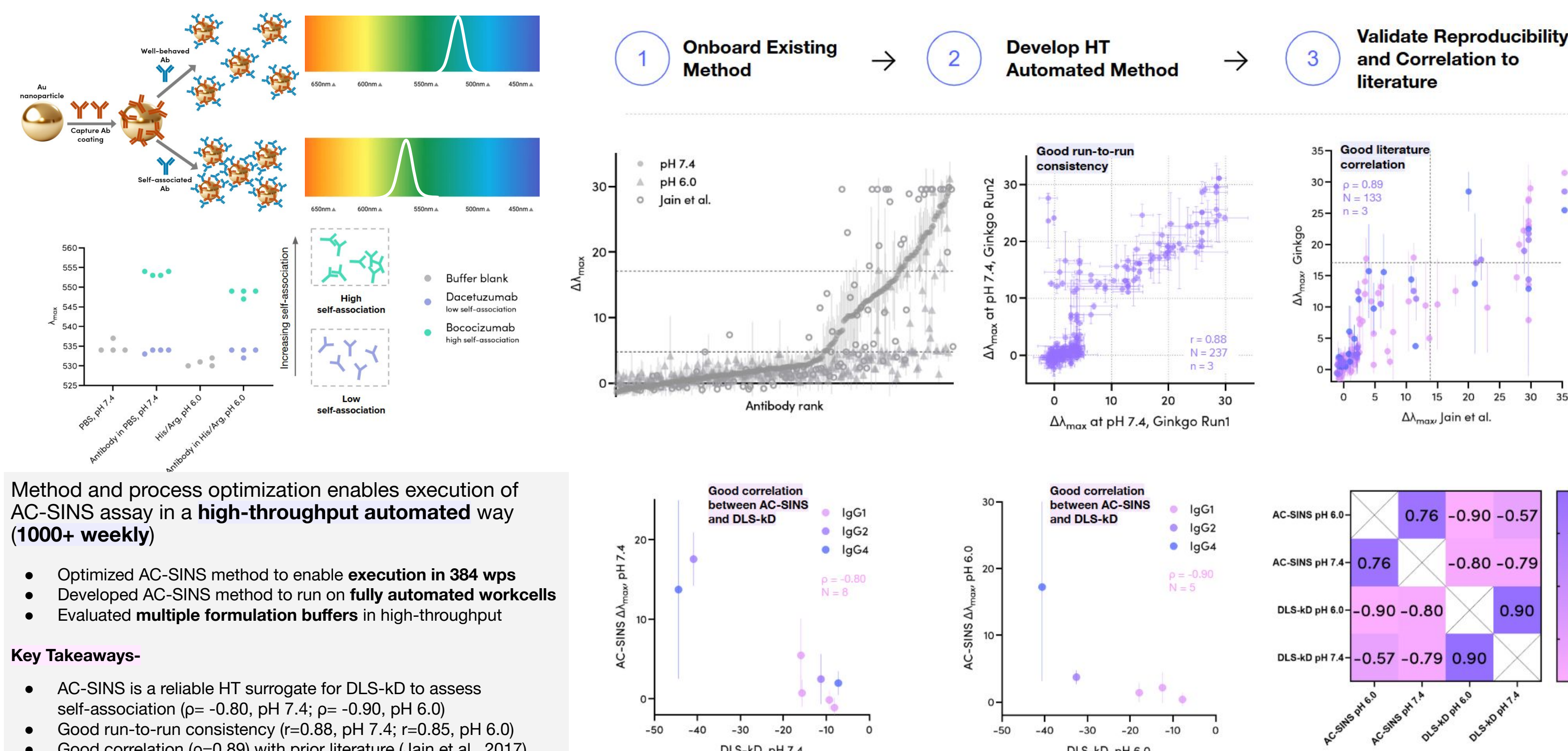


To address this need, we developed a high-throughput (HT) antibody developability platform capable of generating large, reproducible datasets across a suite of optimized biophysical assays. This platform automates and scales established methods, integrating innovations in throughput and data analytics to ensure the consistency and relevance of the results. Our assay panel, based on and expanded from benchmarks articulated by Jain et al. (2017, 2023), evaluates critical developability parameters such as aggregation propensity, thermal stability, hydrophobicity, and self-association.

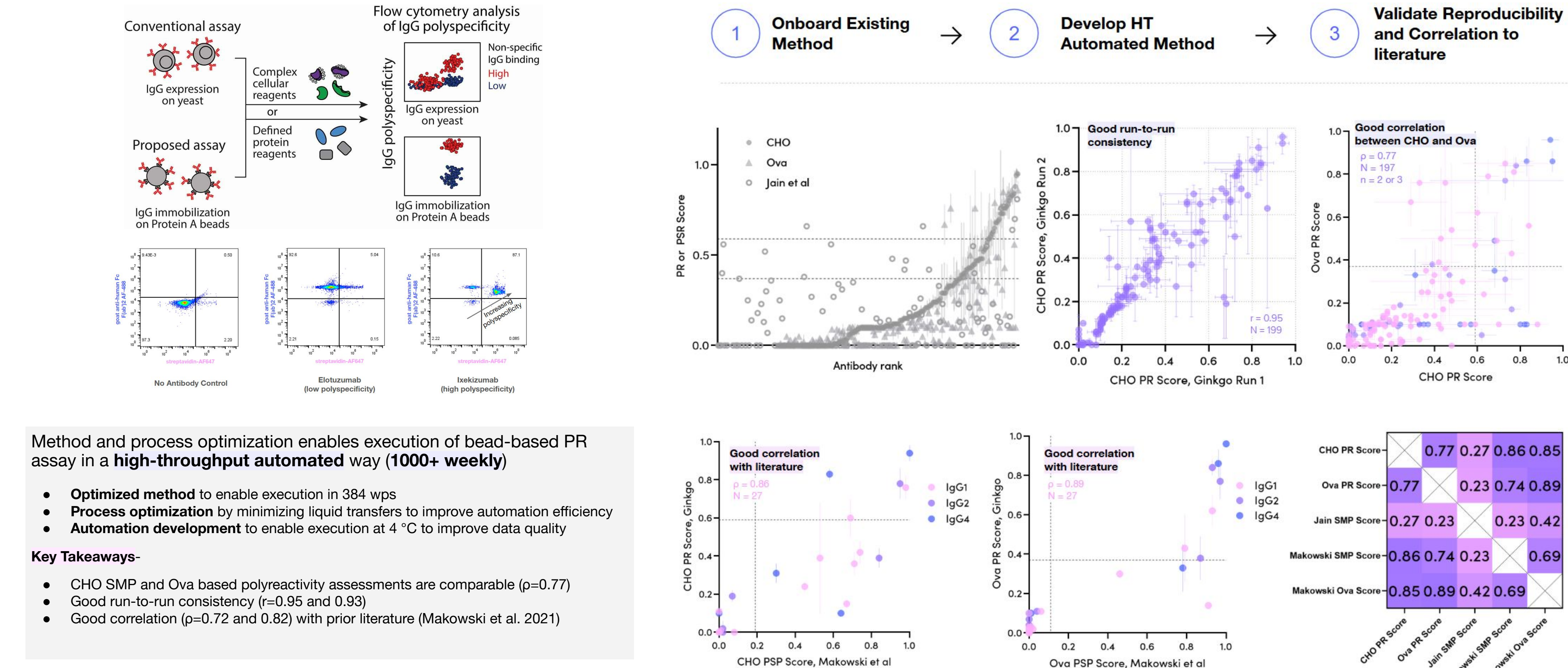
Hydrophobicity (HIC)



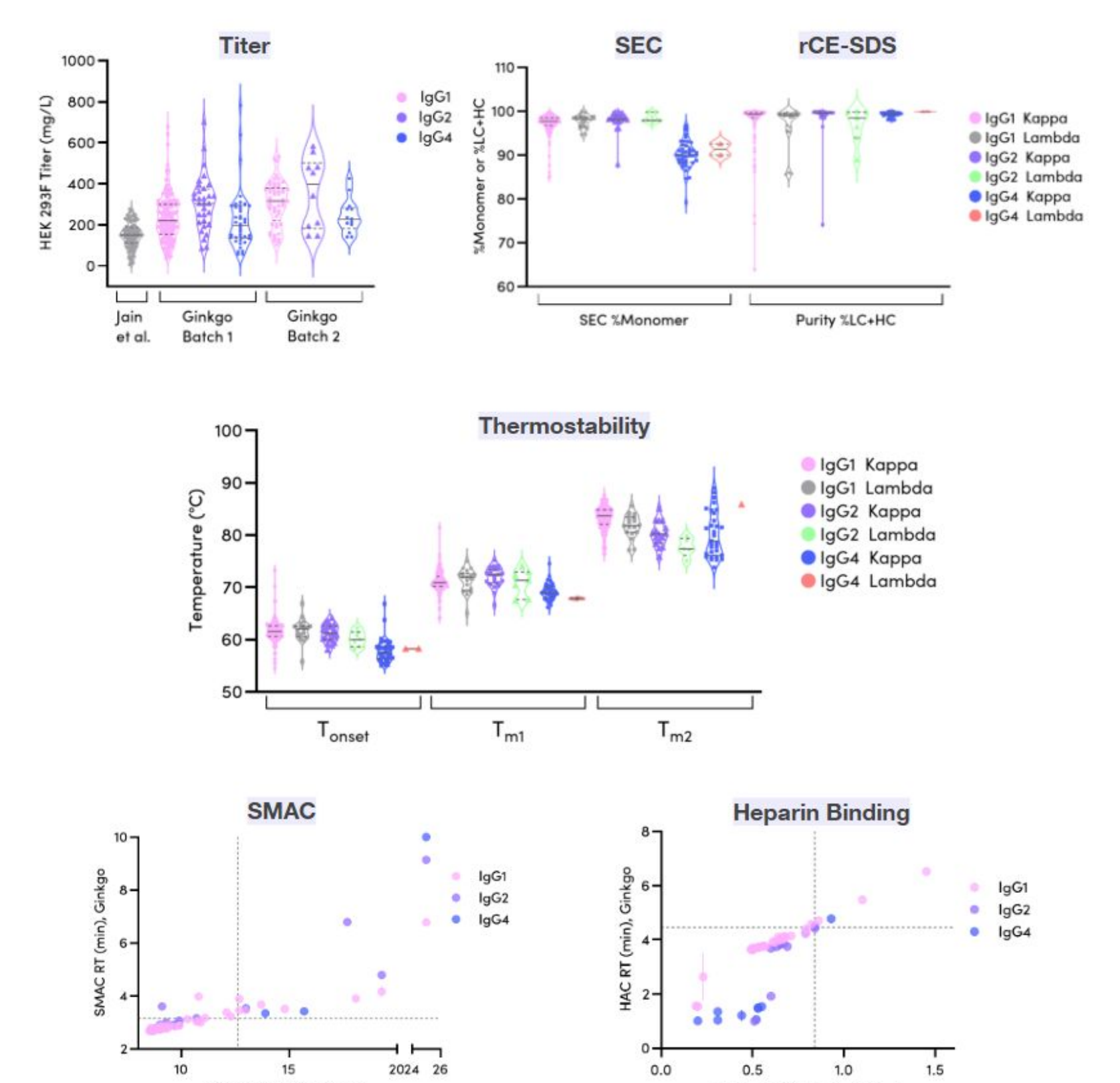
Self Association (AC-SINS and DLS-kD)



Polyreactivity (CHO SMP and Ova)



Other Developability Assays



We offer Multiple Biophysical Assays at Scale

Assays	Method	Key Data Output
Titer	Valita	mg/L
Target Binding	BLI	K_D
Functional Cell-Based Assay	Assay Dependent	Assay Dependent
Aggregation (SE-HPLC)	HPLC	%HMW, %Monomer
FcRn Binding	BLI	K_D
Heparin Binding (HAC)	HPLC	RT
Polyreactivity (CHO or Ova)	Bead-based	PR score
Thermostability	nanoDSF, DSF	T_m , T_{onset}
Self-Association (AC-SINS)	AuNP-based	$\Delta\lambda_{max}$
Self-Association (DLS-kD)	DynaPro III	kD
Hydrophobicity (HI-HPLC)	HPLC	RT
Colloidal Stability (SMAC-HPLC)	HPLC	RT

Conclusions and Future Directions

As a proof of concept, we present data for 246 approved and clinical-stage antibodies. These datasets, generated using our HT wet-lab infrastructure, demonstrate strong agreement with previously published results and offer the scale and quality required for AI/ML modeling. By filling the critical data gap in developability research, this platform enables the training of predictive models that integrate binding and developability parameters, empowering researchers to accelerate candidate selection, reduce development risk, and advance the next generation of antibody therapeutics.

- We are actively expanding our platform to onboard more antibody formats and additional developability assays.
- We have a team of expert AI/ML scientists to help you with your model training and development
- We are expanding our platform to incorporate pooled screening approaches for binding and developability assay characterization to further scale

For technical inquiries, please contact:
Ammar Arsiwala
 Ginkgo Bioworks, Inc.
 Email: aarsiwala@ginkgobioworks.com

Download our preprint and companion dataset for 246 IgGs across 10 developability assays here

