2023-2024 Chen Lab summary

We have finally moved into our new lab space dedicated to AI research in drug discovery in the East Lansing campus. The space quickly filled up as we welcomed new members—Shubham, Lingxiao, Linqing, and Seungmin—joining our four existing members. As a result, Bin now has to get used to the regular commute between GR and EL. He is probably the one who wants a self-driving car the most.

Last year, Han left MSU to pursue a PhD program in the east coast. We wish her all the best. With our new additions, the lab now comprises the best talent from seven countries: US, China, India, Russia, Nepal, Bangladesh, and Korea. We seriously should consider an international cuisine competition in the lab soon.

Last year, many of us were still dealing with post-pandemic trauma, experiencing numerous ups and downs. Rama is perhaps the most qualified to share his experience. He had numerous rejections with his manuscripts, and the journey to secure his K99 was like riding a roller coaster—from "not discussed" to "fundable" "not fundable" "likely fundable" and finally "funded." That journey took two years! A Chinese proverb may comfort him: 天将降大任于斯人也，必先苦其心志，劳其筋骨，饿其体肤 "When heaven is about to bestow a great responsibility on a person, it first exercises their mind with suffering, tasks their body with labor, exposes them to hunger and poverty, and frustrates their endeavors (translated by ChatGPT)". Nevertheless, he finally obtained his K99, paving the way for him to become a tenure-track AP. We hope his journey to publish his manuscripts will be shorter and smoother this year.

In addition to Rama's success, the lab had several other notable achievements as the year ended. Thanks to our fearless leader, Xiaodan, we quickly implemented LLMs for clinical applications and produced two manuscripts. Xiaodan's other work on rural-urban comparison was the first in the state to mine the health records of over 1.5 million patients. We uncovered a high rate of underdiagnosis of MCI in West Michigan, especially in rural areas. This work was published this month and featured by NPR. Ruoqiao's SPIDER manuscript was also officially accepted this month by Cell Systems, a top journal in our field. With Shreya's tremendous effort, we finally published the long overdue work on bispecific antibody target discovery. Our collaborative project on using our AI platform for novel compound discovery was published in the Journal of Experimental & Clinical Cancer Research. The last achievement the entire lab is proud of is organizing the first-ever DahShu Data Science Symposium at MSU. This symposium attracted over 170 attendees, featuring more than 40 invited talks and 40 poster presentations. Bin still can't believe we pulled it off.

Bin worked tirelessly toward the three priorities proposed last year. The top priority will remain this year: getting the legacy projects published. In addition to Rama's two manuscripts, we aim to publish Ke's and Jing's manuscripts soon. We appreciate those folks who spent their winter break helping wrap up our metastatic cancer manuscript. All these projects involve complex modeling and time-consuming biological experiments. We need to figure out an effective way to publish such interdisciplinary work in top journals. Bin printed out 30 relevant papers this week to find an answer. Good luck.

The second priority was to establish an AI center for drug discovery. Although we have had several conversations with our leaders, it seems it takes time to form a formal entity. Nevertheless, we have the space ready, GPU servers ordered, and most importantly, we have advanced the science quickly. Our de novo compounds have been successfully validated in vivo. We have secured multiple NIH grants to apply our platform for drug discovery in several indications.

The third priority was to establish a company for commercialization. We have filed four invention disclosures and have been in talks with stakeholders. Our future entrepreneur Dmitry is ready to start as soon as we address the IP and publish the science.

These priorities will remain the same for next year. In addition, we will place more focus on increasing the impact of our work. We wish ourselves the best of luck in publications and funding applications in 2024, cause Bin really doesn't enjoy roller coasters.

Bin Chen

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