

Day Final

NCHC X OpenACC X NVIDIA

OpenACC
More Science, Less Programming

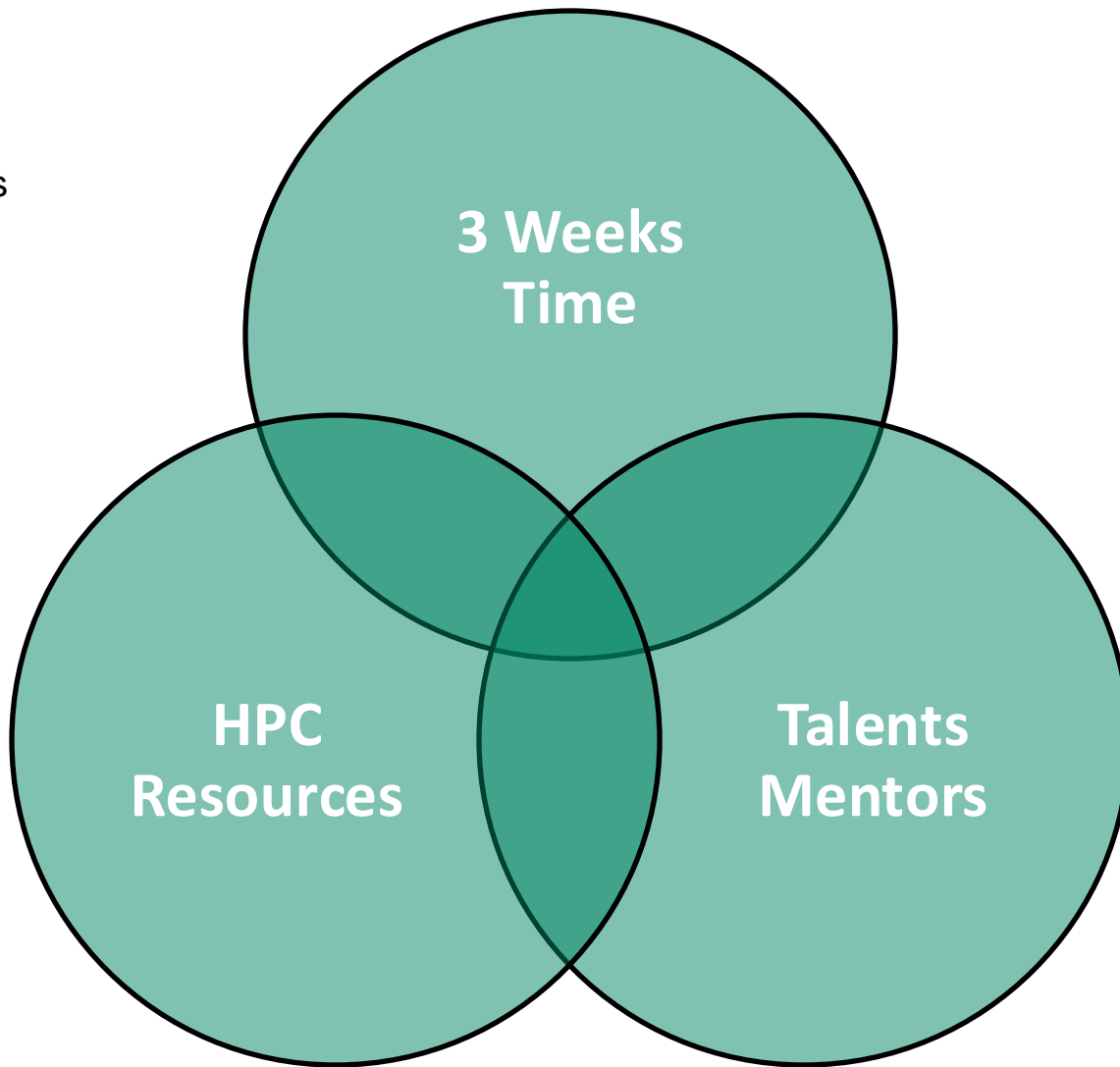
2024 NCHC Open Hackathon

Important Dates

- 2024 / 10 / 15 (Tue) : Registration deadline
- 2024 / 11 / 04~08 : Connecting Mentors and Teams
 - Slack Channel, Emails Group, Line Group
- 2024 / 11 / 13 (Wed) : Day 0: Kick-off Meeting 14:00~17:00 PM (Online)
- 2024 / 11 / 20 (Wed) : Day 1: Scrum #1 Meeting 14:00~15:00 PM (Online)
 - 4-minute presentation per team
- 2024 / 11 / 27 (Wed) : Day 2: Scrum #2 Meeting 14:00~15:00 PM (Online)
 - 4-minute presentation per team
- **2024 / 12 / 04 (Wed) : Final Day 10:00~16:00 PM (In-person at NCHC)**
 - **12-minute presentation + 3-minute Q&A per team**

It is not easy

Thanks Teams and Mentors

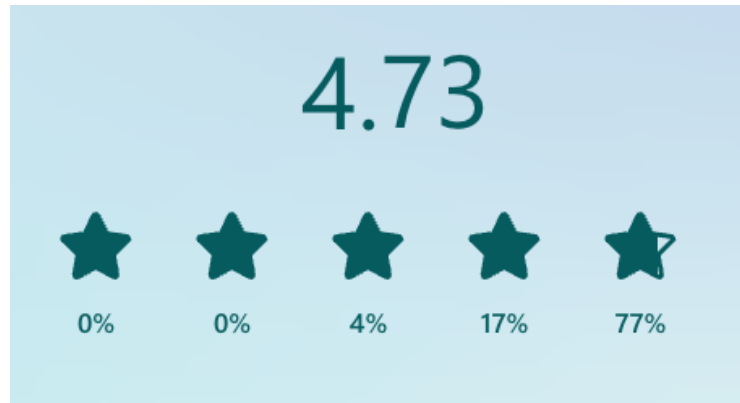


27th Nov Feedback Survey

4. Any other comments/ thoughts? (optional)

8 Responses

ID ↑	Name	Responses
1	anonymous	非常感謝Cliff和Jay!!
2	anonymous	Participating in this activity, I took the initiative to learn extensively, read numerous articles, experimented multiple times with GPU acceleration, and worked closely with my teammates, which was truly an enjoyable experience.
3	anonymous	Thank you for letting us participate in this Hackathon. I learned a lot and optimized our project a lot.
4	anonymous	None.
5	anonymous	如果有更多關於GPU加速概念的教學會更好，尤其在已經使用GPU進行訓練的狀況下(或是推薦教材)
6	anonymous	無
7	anonymous	time is too short but the recommends of mentors are useful (which not easy get from daily research) thanks for giving chance to join this event
8	anonymous	Thank you



67 feedbacks

Agenda

Welcome and Event Overview		10:00~10:25
AM Session		10:25-12:00
Team-3	氣象署-興大應數聯隊	10:30
Team-9	gba-vvm	10:45
Team-5	parallel-minds	11:00
Team-6	nthu_isalab	11:15
Team-7	nolab	11:30
Team-12	cycu-quantum	11:45

Lunch Time		12:00~13:25
PM Session		13:25-15:00
Team-1	dream-chaser	13:30
Team-10	smile-lab	13:45
Team-8	elsa-robotics	14:00
Team-4	ntut_birdsong	14:15
Team-11	plantmen	14:30
Team-2	nycu-hpc-team2	14:45
Wrap-up Session		15:00~

Reminder

- A100/H100 Cluster will be reset by today, please backup your data!
- Welcome any feedback by scanning the QR code.



Presentation

- All presentations will be recorded, please let us know if any confidential information.
- The next presenting team should move to the front row.
- 12 Minutes Presentation + 3 Minutes Q&A.
 - Watch out the floating timer on the screen.
- Fun Activity
 - Each team has 8 stickers with a team alphabet. (L M N O P Q R S T U V W)
 - Each mentor has 2 stickers with a random alphabet. (different from above)
 - How to collect stickers
 - Exchange team stickers during Q&A and lunch time.
 - Say HI to the mentors; they will hand it to you if there's any left. No need for an exchange.
 - How to win a NVIDIA logo hat
 - Top-3 UNIQUE sticker owner teams by 3PM.



Agenda

Welcome and Event Overview		10:00~10:25	
AM Session		10:25-12:00	Speedup
Team-3	氣象署-興大應數聯隊	10:30	40~400X
Team-9	gba-vvm	10:45	18X
Team-5	parallel-minds	11:00	9X
Team-6	nthu_lsalab	11:15	1.23X
Team-7	nolab	11:30	8,282X
Team-12	cycu-quantum	11:45	10,000X

Lunch Time		12:00~13:25	
PM Session		13:25-15:00	Speedup
Team-1	dream-chaser	13:30	7.8X
Team-10	smile-lab	13:45	5.5X
Team-8	elsa-robotics	14:00	11X
Team-4	ntut_birdsong	14:15	3.6X
Team-11	plantmen	14:30	10X
Team-2	nycu-hpc-team2	14:45	3.3X
Wrap-up Session		15:00~	

Protein Folding & AI

2024 Nobel Prizes in Physics & Chemistry



Physics

Geoffrey Hinton
John Hopfield



Chemistry

David Baker
Demis Hassabis
John Jumper

Celebrating Gordon Bell Finalists

Five Gordon Bell Finalists Use the NVIDIA Accelerated Platform for Science at Scale

MULTI-GPU MOLECULAR DYNAMICS

Giuseppe Barca, U. Melbourne



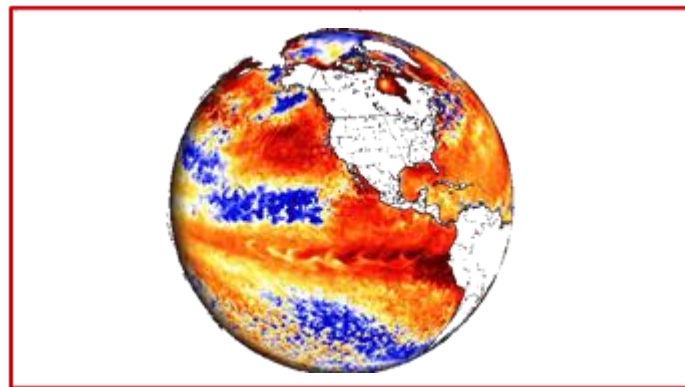
GWAS FOR GENETIC EPISTASIS

David Keyes, KAUST



EMULATION OF GLOBAL ERAS

David Keyes, KAUST



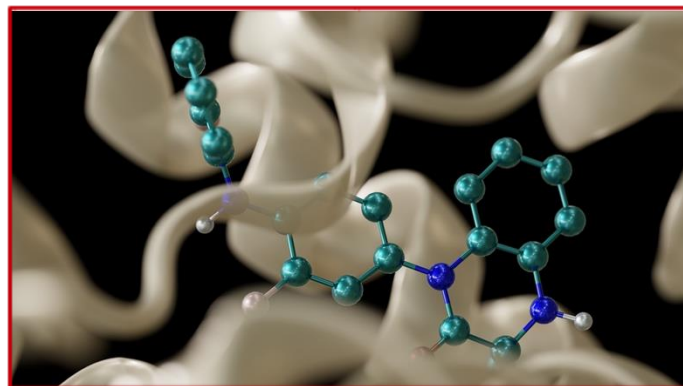
DL FOR TRAINING AND INFERENCE

Abhinav Bhatele, U. Maryland

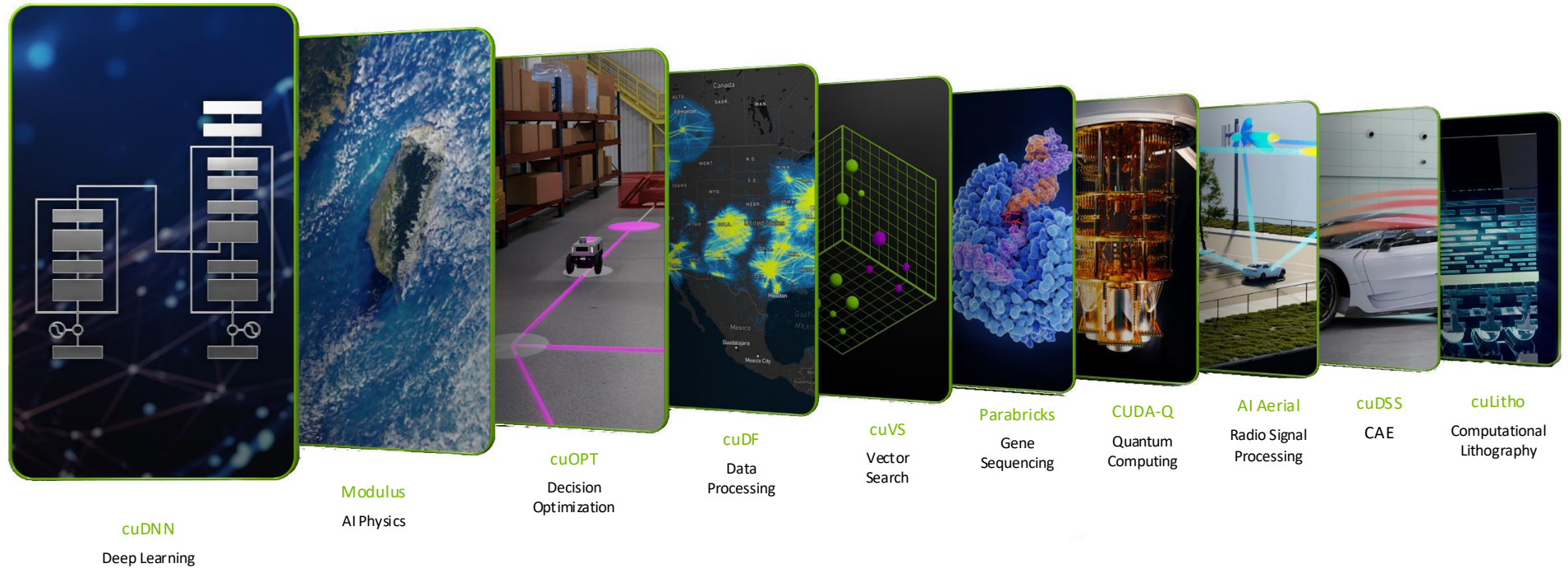


PROTEIN DESIGN

Arvind Ramanathan, ANL



CUDA-X Libraries Accelerate Every Industry



Open Hackathon Objectives

Connect

Developers & Mentors
Apps & Acceleration

Accelerate

Speedup
Energy Efficient

Celebrate

Publication, Co-Paper
Blogs and Talks

Please ack NCHC and Mentors if any publications.

Opportunities to publish at NCHC's website

看 OPEN 黑客松如何帶領了技術變革? DPU把網路，GPU把大型語言模型、大氣科學、量子電路模擬，通通加速！



學研成果

2023.12.07



動態資訊

焦點新聞

活動專區

動態集錦

招標公告

出版品專區

專利/商標與技術移轉

影音專區

輿情回應

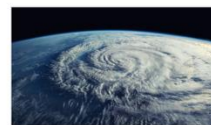
日期 開始日期 ~ 結束日期 關鍵字 關鍵字

ex : 2019/01/01



2024.01.30

【2023 NCHC, NVIDIA, OpenACC 黑客松】- HPC、DPU及量子運算加速成果



2024.01.30

【2023 NCHC, NVIDIA, OpenACC 黑客松】-大氣科學應用加速成果



2024.01.30

【2023 NCHC, NVIDIA, OpenACC 黑客松】-人工智慧應用加速成果

Opportunities to publish at NCHC's website

Please summarize your team's achievements during the Open Hackathon (see below example).

淺顯易懂的標題

研究領域示意圖

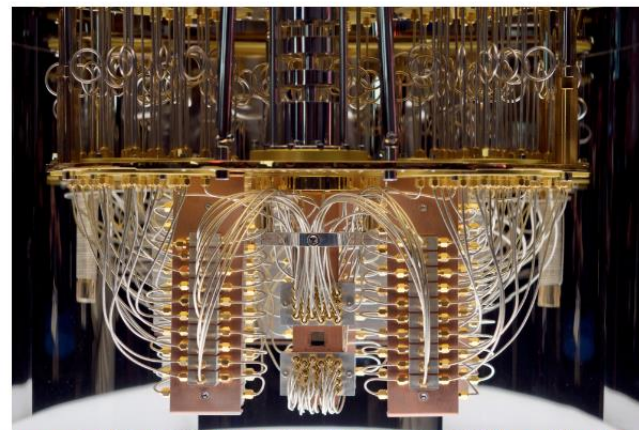
{ } 團隊來自 { } 老師帶領的 { } 實驗室，
將 { } 加速了 { } 倍！！

250~500 字儘量老嫗能解的描述。
為什麼這個領域重要？為什麼這個命題重要？
加速成果？加速帶來什麼影響和潛力？

和加速成果相關的補充數據

報告投影片連結 (由國網上傳到 github)

量子算法模擬



haofan2023團隊成員來自臺灣大學資工系「洪士灝老師實驗室」，將量子演算法QAOA加速468倍！

— NVIDIA Mentors: Tian Zheng, Frank Lin, Yun-Yuan Wang

量子技術正以驚人的速度發展，預示著我們即將進入量子計算的時代。在這個過程中，量子電路模擬成為一個關鍵工具，它在量子硬體和軟體的開發中扮演著重要的角色，特別是在處理量子程式的編寫和驗證方面。傳統電腦的強模擬能夠獲得完整的量子狀態信息。這使得傳統電腦在構建量子系統方面變得不可或缺，尤其是在當前噪聲較多的中等規模量子（NISQ）時代。

量子近似優化算法（QAOA）是一種常用的量子算法，用於通過近似解來解決組合優化問題。然而，在虛擬量子計算機上執行QAOA對於解決需要大規模量子電路模擬的組合優化問題而言，會遇到模擬速度較慢的問題。團隊使用數學優化來壓縮量子操作，並結合有效的位元操作進一步降低計算複雜性，透過GPU加速最高獲取468倍的加速效果！

Table 1: The elapsed time of 5-level QAOA (unit: second, double).

Qubit	CPU _{Single}	CPU _{Multiple}	CPU _{Cache}	GPU _{Cache}	GPU _{All}
23	29.80	1.28 (23x)	1.28 (63x)	0.24 (120x)	0.06 (341x)
24	68.00	3.46 (20x)	3.46 (43x)	0.55 (123x)	0.12 (382x)
25	152.52	15.32 (10x)	15.31 (45x)	1.19 (127x)	0.23 (404x)
26	330.69	33.83 (10x)	33.83 (56x)	2.60 (126x)	0.56 (417x)
27	712.26	72.66 (10x)	72.66 (54x)	5.59 (127x)	1.08 (427x)
28	1556.87	156.52 (10x)	156.52 (54x)	11.96 (130x)	2.17 (445x)
29	3325.55	335.09 (10x)	335.09 (49x)	25.73 (129x)	4.45 (451x)
30	7226.46	718.33 (10x)	718.33 (47x)	55.20 (130x)	9.22 (468x)

更多資訊請看：<https://github.com/nqobu/nvidia/raw/main/20231207/Team02.pdf>

Thank You

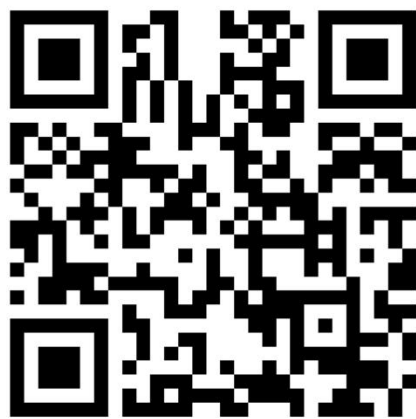
90+ contributors in this hackathon

1	Dream Chaser	Lead	Quan-Ze Gao	9	GBA-VVM GPU-Based Acc	Lead	Min-Ken Hsieh	5	Parallel Minds	Lead	詩柔 程	Infra Manageme	Johnson Sun
		Member	Chi-Ching Lee			Member	Shao-Yu Tseng			Member	恩伶 熊	Infra Manageme	Kuan-Ting Kuan-Tir
		Member	Cheng-Yu Ma			Member	Yu-Hsuan Fan			Member	之豫 謝	Event Host	CK Lee
		Mentor	Anthony Chang			Member	Peng-Jen Chen			Mentor	Reese Wang	Event Host	Jay Chen
		Mentor	Ying-Ja Chen			Member	Jia-Xin Guo					Account Manag	Vincent Chiu
2	NYCU HPC team	Lead	Chu-Siang Tseng	10	smile lab	Mentor	Min Yu	6	NTHU_LSALAB	Lead	Yong Xuan Huang	DevTech Mange	Ryan Jeng
		Member	宸愷 張							Member	Bi Shun Ke	Product Team M	Elica Kyoseva
		Member	承緯 林			Lead	Pau-Choo Chung			Member	Chuan Ming Ou	Hackathon Team	Bharat Kumar
		Member	舜宇 楊			Member	Kai-Xiang Liu			Member	Jerry Chou	Hackathon Team	Apoorva Laharia
		Member	佳輝 沈			Member	Yu-Ping Gao			Mentor	Kevin Chen	Hackathon Team	Yash Gupta
		Member	宗樺 吳			Member	Jia-Xian Jian			Mentor	SungTa Tsai	Marketing	Jinny Lin
		Mentor	Shijie Wang			Member	Chin-Hua Liu			Lead	Ran-Yu Chang	SA Manager	Eddie Huang
3	氣象署-興大應數	Lead	SHANG-EN LI			Member	Yu-Cheng Chang	7	NoLab	Member	Zhen-Jun Liu	SA Manager	Eric Kang
		Member	Ting-An Chen			Member	Yen-Jung Chiu			Member	Yi-Chun Chang	NCHC	Zhoujin Wu
		Member	Jen-Her Chen			Member	Po-Hao Hsu			Member	Pei-Che Hsu		
		Member	Pang-Yen Liu			Member	Chao-Chun Chuang			Member	Ssu-Yi Chen		
		Member	Lu-Hung Chen			Mentor	Ken Liao			Member	Yu-Cheng Chung		
		Member	Chun-Hao Teng			Mentor	Yang-Hsien Lin			Mentor	Pika Wang		
		Mentor	Leo Chen							Mentor	Ikko Hamamura		
4	NTUT_BirdSong							8	Elsa Robotics	Mentor	Tian Cheng		
		Lead	Shihwen Chen	11	Plantmen	Lead	Jonas Tsai			Lead	Yung Shun Chan		
		Member	Jin-Jia Hu			Member	Yun Lin			Member	Yu-Zhong Chen		
		Member	Yang-Yu Ou			Member	Sheng-Chieh Lai			Member	Chon-Hang Lam		
		Member	Xin-He Chen			Member	Yu-Fei Shih			Mentor	Johnson Sun		
		Member	Yi-Yang Syu			Member	Yu-Lun Hsieh			Mentor	Frank Lin		
		Member	Yung-Yu Chen	12	CYCU_Quantum	Mentor	Cliff Chiu						
		Member	Shih-Cheng Ma			Lead	晏瑞 張						
		Mentor	Virginia Chen			Member	韋廷 王						
		Mentor	Iven Fu			Member	政維 蘇						
						Mentor	Pika Wang						
						Mentor	Ikko Hamamura						
						Mentor	Anderson Meng						

Final Day - Feedback Survey

<https://forms.gle/UZXxKdsywvcxQNv59>

12/04 NCHC Open Hackathon
2024 - Feedback Survey





Thank You

OpenACC
More Science, Less Programming