Summer 2025 Schedule for Quantum + Chips

Venue: 3-230 Keller Hall

Week 1: Physics Deep Dive

Embark on an exhilarating weeklong deep dive into foundational topics at the heart of quantum + chips. Morning will be lectures covering key essential concepts, led by Professor Tony Low. Afternoon, you will unleash your creativity and put your newfound knowledge to a hackathon. The winning team will be receiving an award plaque, in addition to the certificate of participation. Afternoon session will be led by members from Professor Tony Low group.

July 28, Monday -- Quantum Physics Day

8:30 am - 8:50 am	Breakfast
8:50 am - 9:00 am	Welcome and logistics (Speaker: Tony Low)
9:00 am - 11:30 am	Quantum Physics Primer (Speaker: Tony Low)
11:30 am – 12:30 pm	Lunch
12:30 pm – 2:30 pm	Schrodinger equation (Instructor: Johnathas Forte)
2:30 pm - 4 pm	**Hackathon**

July 29, Tuesday -- Semiconductor & Transistor Day

8:30 am – 9:00 am	Breakfast
9:00 am - 11:30 am	Semiconductor Primer (Speaker: Tony Low)
11:30 am – 12:30 pm	Lunch
12:30 pm – 2:30 pm	Electronic structure (Instructor: Seungjun Lee)
2:30 pm - 4 pm	**Hackathon**

July 30, Wednesday -- Spintronics Day

8:30 am – 9:00 am	Breakfast
9:00 am - 11:30 am	Transistor & Spintronics Primer (Speaker: Tony Low)
11:30 am – 12:30 pm	Lunch
12:30 pm – 2:30 pm	Magnetization dynamics (Instructor: Duarte Sousa)
2:30 pm - 4 pm	**Hackathon**

July 31, Thursday -- Quantum Computing Day

8:30 am – 9:00 am	Breakfast
9:00 am - 11:30 am	Quantum Computing Primer (Speaker: Tony Low)
11:30 am – 12:30 pm	Lunch
12:30 pm – 2:30 pm	EPR & Bell's inequality (Instructor: Sami Ferrag)
2:30 pm - 4 pm	**Hackathon**

August 1, Friday -- Quantum Computing Day

8:30 am – 9:00 am	Breakfast
9:00 am - 11:30 am	Quantum Computing Primer (Speaker: Tony Low)
11:30 am – 12:30 pm	Lunch
12:30 pm – 2:30 pm	Quantum circuits (Instructor: Johnathas Forte)
2:30 pm - 4 pm	**Hackathon**
6 pm	Catering Dinner at Dorm

Venue: 3-180 Keller Hall

Week 2: Deep Tech

Get ready to broaden your perspective on a wide range of computing paradigms related to quantum and chips. You will be exposed to different types of computing technologies, such as the transistor and how they are used in CPU, GPU to TPU. Beyond the transistors, we venture into spintronics, optical computing, Ising computing, and quantum computing, with speakers from both academia and industry.

August 4, Monday-- Semiconductor Technology Day 1

8:30 am - 9:00 am	Breakfast
9:00 am - 10:00 am	How we got to Now: a brief history of semiconductor devices (Speaker: Sarah Swisher - UMN)
10:00 am - 11:00 am	Overview of semiconductor devices and beyond (Speaker: Steve Koester - U Notre Dame)
11:00 am – 11:30 am	Graduate program at UMN ECE (Speaker: Ann Rausch - UMN)
11:30 am – 1:00 pm	Lunch
1:00 pm - 2:00 pm	Introduction to Advanced Semiconductor Technology (Speaker: Chung Foong Tan- Intel)
2:00 pm - 3:00 pm	Memory/Data storage Eco System (Speaker: Sharat Batra - U Minnesota)
3:00 pm - 5:00 pm	**Hackathon**

August 5, Tuesday -- Semiconductor Technology Day 2

8:30 am - 9:00 am	Breakfast
9:00 am - 10:00 am	Introduction to semiconductor fabrication (Speaker: Tyler Colling - Veeco)
10: 00 am – 11:30 am	A tour to MNC
11: 30 am – 11:40 am	**Group Photo**
11:40 pm - 1:00 pm	Lunch

1:00 pm -2:00 pm	Codesigning Computing Systems for Artificial Intelligence (Speaker: Suvinay Subramanian - Google)
2:00 pm -3:00 pm	Physical Design and LLM-integrated Co-design (Speaker: Kavya Sreedhar - Google)
3:00 am - 4:00 pm	Artificial Intelligence: From Neurons to Large Language Models and Beyond (Speaker: Keshab Parhi - U Minnesota)
4:00 pm - 5:00 pm	**Hackathon**
6 pm	Catering Dinner at Dorm

August 6, Wednesday – Non von Neumann Computing Day

8:30 am - 9:00 am	Breakfast
9:00 am - 10:00 am	Introduction to Non von Neumann Computing (Speaker: Sachin Sapatnekar - UMN)
10:00 am - 11:00 am	COBI: CMOS Oscillator Based Ising Computers (Speaker: Chris Kim - UMN)
11:00 am - 12:00 pm	Novel computing schemes with multiferroic devices (Speaker: Cheng Gong – University of Maryland)
12:00 am - 1:30 pm	Lunch
1:30 pm – 2:30 pm	On Fundamental Physical Limits to Computing (Speaker: Ulya Karpuzcu - UMN)
2:30 pm – 3:30 pm	In-memory computing with Spintronics (Speaker: Jian-Ping Wang – UMN)
3:00 pm - 5:00 pm	**Hackathon Submission**

August 7, Thursday – Non von Neumann Computing Day

8:30 am	Breakfast-to-go, board bus 8:30 am
9:00 am - 11:30 am	Seagate Tour (Seagate coordinator: Steve Mattson, Minnesota coordinator: Johnathas Forte)

12:00 pm - 1:00 pm	Lunch
1:00 pm - 2:00 pm	Bio-inspired computing (Speaker: Saptarshi Das - Penn State U)
2:00 am - 3:00 pm	Quantum Computing Hardware overview (Speaker: Gang Qiu - U Minnesota)
3:00 am - 4:00 pm	Quantum circuits for error correction (Speaker: Keshab Parhi - U Minnesota)
4:00 pm - 5:00 pm	Panel discussion: career paths in the “Quantum+Chips”, industry and academia (Moderator: Sarah Swisher - U Minnesota, Monica Van Dieren - Nvidia, Saptarshi Das - Penn State U, Gang Qiu - U Minnesota, Joseph Davies - Quantinuum)
5:00 pm - 6:00 pm	AI for Quantum Computing (Speaker: Monica Van Dieren - Nvidia)
6:00 pm - 7:00 pm	**Dinner**

August 8, Friday – Quantum Computing Day

8:30 am - 9:00 am	Breakfast
9:00 am - 9:30 am	Overview of trapped ion quantum computing (Speaker: Joseph Davies - Quantinuum)
9:30 am - 10:00 am	working on a trapped ion system (Speaker: Tim Peterson - Quantinuum)
10:00 am - 10:30 am	qpc theory and emulation (Speaker: Michael Schecter - Quantinuum)
10:30 - 10:45 am	Coffee break
10:45 am - 11:15 am	scaling ion traps (Speaker: Daniel Ouellette-Quantinuum)
11:15 am - 11:45 am	materials challenges (Speaker: Molly Andersen - Quantinuum)

11:45 am - 12:15 pm	Programming an Accelerated Quantum Supercomputer with CUDA-Q (Speaker: Monica Van Dieren - Nvidia)
12:15 pm - 12: 30 pm	**Hackathon Award** + **Participation Certificate**
12:30 pm - 2:00 pm	Lunch