Dr Joel Li

Co-founder and CTO of AI startup backed by leading minds in AI and VCs with extensive leadership and hands-on experience in developing and applying cutting edge AI solutions to real world problems

Employment History

Co-founder and CTO at Cosmos Innovation

January 2020 — Present

- Co-founded **Cosmos Innovation**, AI-first startup that is building next generation solar technology
- Cosmos Innovation has raised over US$23M to date and is backed by leading minds in AI and leading funds in Silicon Valley, Singapore and New York including **Temasek** Xora, ex-CEO of Google, **Eric Schmidt**'s Innovation Endeavors, Demis Hassabis (CEO of **Google DeepMind**), **Two Sigma** Ventures (Leading Hedge Fund), David Siegel (Founder of Two Sigma), Richard Socher (CEO of You.com), etc.
- Cosmos Innovation was selected to join the prestigious **World Economic Forum**'s (WEF) Technology Pioneers 2024 Cohort as one of the 100 leading tech start-ups in the world
- Press release of Cosmos Innovation in October 2023 was covered by over **400** global media outlets
- **Leading AI team** to develop cutting-edge proprietary AI stack for the semiconductor/solar industry
- **Leading Process team** to develop next generation perovskite silicon tandem **solar cell technology**
- **Led the successful R&D Line build-up, hired process team** and technical advisors
- **Led project engagements** with customers and partners which include the world's leading semiconductor companies and R&D Institutes
- Team achieved **outstanding results** and glowing testimonials from leading semiconductor companies and R&D institutes
- Came up with list of software **platform features** to be built based on process experience and understanding of process needs
- **Fund-raising** and **maintaining relationships** with investors, advisors, partners and stakeholders
- Worked on company operations ranging from Finance, Legal, HR to Accounting
- Consulted for VCs on other startups as part of their due diligence process

Adjunct Faculty in AI at National University of Singapore

August 2022 — Present

- Invited to serve as an Adjunct Assistant Professor at NUS and currently teaches **Artificial Intelligence** (incl. GenAI), covering both theory and real-world applications, as well as the challenges and implications of this rapidly evolving field
- Nominated for teaching award

AI Team Lead at A*STAR, Institute of Infocomm Research

June 2018 — December 2019

- Led AI projects that developed solutions for the Semiconductor, Materials and Chemicals Industries

- Scoped **multi-million dollar projects** and worked with leading Tier-1 Manufacturers and R&D Institutes
- Served as liaison between AI teams and Semiconductor/Materials domain experts
- Worked on and scoped projects for the Accelerated Materials Development for Manufacturing (AMDM) program
- Led the work with Institute of Microelectronics (IME), A*STAR and applied cutting-edge AI algorithms to optimize their semiconductor processes
- Achieved great results with AI that showed high value to Semiconductor Manufacturers

Group Head at National University of Singapore, Solar Energy Research Institute of Singapore

June 2015 — May 2018

- Managed a group of scientists, engineers and PhD students that focuses on developing commercial solar cell technologies
- Carried out business development of group's technology to world's leading silicon solar cell manufacturers
- Led group to develop multicrystalline silicon solar cells that achieve **world-class efficiency**. Thorough DOE and analysis of experimental data enabled us to understand the loss mechanisms and optimize our process
- Led the successful development of a low-cost and effective technique to texture diamond-wire sawn (DWS) wafers that garnered strong interest from industry and a license was sold to tier-1 cell manufacturer
- Texturing technology won the **PV Magazine's Top 25 PV Manufacturing Innovations 2018**
- Extensive news coverage on our texturing technology by major international PV and scientific magazines
- Awarded an invited talk at PV Asia 2017 to present on our cutting-edge texturing technology
- Led group to develop commercially viable solutions for light-induced degradation (LID) and potential induced degradation (PID) of multicrystalline silicon solar cells. Work has been published in scientific journals and presented at several international PV conferences
- Drove the successful development of an optical coating technology that can enhance light trapping of solar cells and result in substantial efficiency gain. Provisional patent has been assigned for this ground-breaking technology
- Technical consultant to top tier manufacturers around the world, which involves presenting to the Chief Technical Officer or Chief Scientist of these multi-national corporations (MNCs)

Project Manager at National University of Singapore, Solar Energy Research Institute of Singapore

December 2014 — June 2015

- Provided technical consultancy to solar manufacturer to assess the potential and feasibility of implementing next generation technology to their production line
- Led collaborative industry project with a top ten solar manufacturer to investigate the limiting defects in their solar cell material
- Independently analyzed and assessed technical products for collaborative project
- Completed tender preparation work that typically takes months within a week
- Played key role in fabricating high efficiency solar cells with industry partner

Research Intern at Hanwha Solar America, USA

July 2012 — August 2012

- Played key role in fabricating batch of solar cells that achieved highest lab efficiency
- Redesigned and improved the company's process time by 20% through insights gained from data analysis of photoluminescence imaging and reflectivity techniques
- Simulated and optimized the metallization design used by their manufacturing plant to improve solar cell efficiency by 10% compared to their previous design
- Developed sheet resistance imaging and reflectivity measurement capabilities, designed their operating procedures and trained 10 research scientists to use the systems

Research Intern at A*STAR, Data Storage Institute

May 2006 — July 2006

- Conducted research on Heat Assisted Magnetic Recording (HAMR) technology to enable next generation high capacity hard disk drives
- Literature review of HAMR research work
- Involved in the fabrication and characterization of optical waveguides

Education

Ph.D. in Electrical Engineering, Ph.D. Minor in Materials Science, M.S. in Electrical Engineering, Stanford University

2009 — 2014

Graduated 4.0 GPA

- Initiated and led pioneer work done in collaboration with AQT Solar, to investigate the role of grain boundaries in Cu(In,Ga)Se2 and Cu2ZnSn(S,Se)4 thin-film solar cells
- First author publication in top-tier journal, Advanced Materials. This work was also reported by Materials Views, an online newsletter which covers the most interesting breakthroughs in the field, selected by editors of top journals
- Presented work at one of the world's largest solar conference, IEEE Photovoltaic Specialists Conference, and had an audience of over 300
- Regarded as the world's expert in this area and was invited to write a book chapter which was published by Wiley in January 2015
- Work on grain boundaries in Cu2ZnSnS4 and Cu2ZnSn(S,Se)4 solar cells has been cited and presented at tutorials and talks by leading experts in the field
- Collaborated with internationally renowned National Renewable Energy Laboratory to develop world's first solar cell that has a biaxially textured absorber layer
- Filed patent on the formation of biaxially textured calcium fluoride template layer
- Published world's first device modeling work of biaxially textured thin-film solar cell

B.Eng. Electrical and Computer Engineering, National University of Singapore

2004 — 2008

Graduated with First Class Honors

- Thesis title: Modeling of power market using type-2 fuzzy logic and game theory
- Conceptualized and developed a realistic power market model for final year project by combining concepts from **artificial intelligence**, **math** and **economics**
- Presented and published work in proceedings of the IEEE World Congress on Computational Intelligence (WCCI 2008), Hong Kong, June 1 - 6, 2008
- Awarded **1st prize** in IEEE Region 10 (Asia Pacific) Undergraduate Student Paper Contest
- Awarded NUS Faculty of Engineering Innovation Award given to top 1% of projects
- Awarded ABB Prize given to top 5 out of over 100 final year projects

- Led an engineering team of 4 to build software with **C++** and hardware for a smart home system. Examiners selected this project as a role model out of 60 for the class

Science Research Programme, NUS and Gifted Education Branch, Ministry of Education, Singapore

2000 — 2001

- Selected from over 20,000 students as one of 100 participants in the Science Research Programme, the premier research attachment programmes for junior college students
- Selected to be one of 3 VIP presenters out of the 100
- Developed an algorithm to produce a whole new set of pandiagonal magic squares which was thought impossible to exist by my advising professor from the department of Statistics and Applied Probability in NUS
- Published in the Proceedings of 13th Science Research Congress, Singapore, March 10, 2001

Awards and Scholarships

National Research Foundation PhD Scholarship

2008

1st prize in IEEE Region 10 (Asia Pacific) Undergraduate Student Paper Contest

2008

National University of Singapore Scholarships

2005 — 2008

Dean's List (Faculty of Engineering, NUS)

2005 — 2008

VIP Presenter (Science Research Congress)

2001

Extra-curricular activities

Founding President at NUS Board Games group (TGiG)

2006 — 2008

- Founded board games group at NUS
- Headed the founding committee
- Led the organization of Singapore's 1st Inter-tertiary Board Games competition among students from NUS, NTU and SMU

Teaching Experience

NUS Lecturer

2017 — 2018

- Lecturer of solar cell course in NUS Electrical and Engineering Department
- Taught students how to apply knowledge to solve real-world industry problems
- Nominated for teaching award