Moving Technological Inventions To the Commercial Marketplace
“What is required to translate a technology innovation into a commercially viable product or service?”

Moving Inventive Technologies from the Lab to the Market place
Since 2013, over 40 LLP teams made up of professors, post-docs, PhDs and MBA students have successfully completed an intensive 10-week entrepreneurial experience to learn what it takes to move an inventive technology from the lab to the commercial marketplace.

LLP@SG is modelled after the US National Science Foundation’s (NSF) I-Corps programme designed specifically to educate research scientists and engineers on entrepreneurship, to turn an inventive technology into a commercially viable product and feasible business venture.

Insights to finding impactful innovation

Under the expert guidance of industry mentors and experienced faculty, LLP provides the researcher a safe platform to learn quickly and “fail less”, by getting the critical success factors right, such as:

- **Finding a problem-solution fit**
  “Through this programme, we have discovered new market needs by intensive customer interviews, which further define the value proposition of our technology.” (A/Prof Huang De Jian, PI of Team “Berry Factory”, LLP@SG3 cohort of 2015)

- **Developing a commercially viable product**
  “.. LLP helped us to zoom into what the best value proposition could be for a certain customer and which customer segment should we be addressing first. It helped us bridge the gap between technology and product.” (A/Prof Hari Krishna Garg, PI of Team “LuxmiTel” LLP@SG2 cohort of 2014)

With real market insights and concrete market data gathered, evidence-based entrepreneurship is a first step to moving a researcher’s technology towards successful commercialisation.
Lean LaunchPad Pedagogy: Experiential Learning

“The LeanLaunchPad is a new way of approaching entrepreneurship and innovation.” – Adjunct Prof Jerry Engel, Faculty Director, NSF I-Corps Programme

There are no facts inside the lab or building, researchers are pushed to go beyond their comfort zone, to spend a good amount of time early on in their technology development, talking to potential users, customers, regulators and other relevant stakeholders, understanding the landscape and challenges of the market space they want to get in.

Lean LaunchPad Framework

Commercialization teams formed will comprise of:

• the Principal Investigator (professor/inventor) and his/her senior researcher (who may be a post-doc, PhD student) as an Entrepreneurial Lead (EL1) who has deep knowledge of the technology and a keen interest to investigate the commercial landscape of the technology.
• one or two business leads (EL2) who may be MBAs, Business graduates or students or working professionals
• an industry mentor

Teams will be grouped into 3 technology tracks: ICT, Engineering and Life Sciences. The team presents key insights and market findings in the weekly track sessions. The critique and insights of each track faculty is core to the teaching curriculum and that includes peer interactions and learning across teams and disciplines.

Programme Methodology

Based on the Lean methodology of Business Model Design, Customer Development and Agile Development, teams learn through a scientific approach of hypotheses testing, iterations and pivoting, which simulates an experimental methodology that researchers can easily relate to:

• The Business Model Canvas provides a systematic approach to quickly evaluate the commercial potential of an invention and shape its value proposition within a very short time frame. Each team formulates their technology commercialization hypotheses. 80% of the course time will be spent conducting interviews to test and validate these hypotheses. Teams will discover that many of their initial hypotheses may be wrong and iterations and pivots will be expected.

• Minimum Viable Product (MVP) & Agile Engineering
  Part of market testing involves the development of a MVP as a tangible tool to effectively communicate with potential customers and apply agile engineering in the early development of the product.

“I don’t have to design the product to be having all the features, having the features just enough to go into the market, and then to understand what the market really wants.” (Asst. Prof Raye Yeow, PI of Team “Emosis”, LLP@SG2 cohort of 2014)
Mentorship

LLP@SG has benefitted from the generous spirit of mentors who work with the teams throughout the programme. Teams meet with the mentors once a week for deep dive discussions. By tapping on the wealth of experience, knowledge and wide industry contacts, both locally and regionally, researchers have gained tremendously from our mentors, in their business understanding, forming new customer relationships and industry connections that will be important in their commercialisation plan forward.

“It is a great opportunity for mentors with experience and also with business exposure, to reinforce what the instructors have shared during the sessions. With real life examples, the researchers can relate better and the impact is much much higher.” Mr SC Cheong, Managing Dir. Mdesigns Solutions (Mentor)

Lessons Learned & Insights about the Technology Commercialization Process:

“Ultimately the team learned not only what was taught in the course but also about themselves, as an individual…” - Dr Ting Dor Ngi (LLP@SG Life Science Faculty)

“It is a good platform for one to discover, if becoming a start-up is their cup of tea.. watching the mentees grow and discover for themselves, is my shot of adrenaline.” – Ms Margaret Ong, Managing Partner, GMA Accelerator (Mentor, LLP@SG 2 & 3)

“Definitely one of the key advantages of this programme is the accelerated mode...something that initially we didn’t even think was feasible to do...and one of the best takeaways is that we learned how to look at things from the investors’ perspective..” - Dr Vojislav Jovanovic (Entrepreneurial Lead of Team “Berry Factory”, LLP@SG3 cohort of 2015)

“LLP is not a programme by itself .. we want the teams to take their technology the next step further..and so the other adaptation we have made, is to develop a post-LLP process to help facilitate their connection to the existing ecosystem and making the transition process seamless.” Prof Wong Poh Kam (Director, NUS Entrepreneurship Centre, Lead Faculty of LLP@SG).

POST-LLP

The post-LLP process facilitates the formation of concrete follow-up action plans, including support in building a MVP, further proof-of-concept or development work, licensing strategies and new venture creation. Support will be provided in the form of:

- MVP Workshop
- Business Advisory and Mentoring Support
- Business Plan and Financial Model Development
- Pitching and Presentation Skills Trainings
- Proof-of-Concept and other Grants Application Preparation
4th LLP@SG run 13 Aug – 16 Oct 2015

Programme Schedule:
• Bootcamp (Aug 13 - 14, 2015)
• 8 Track sessions (every Wednesday from Aug 19 - Oct 12)
• Final Presentations Day (Oct 16 2015)

Registration is now open to:
• Research teams from polytechnics, universities and research institutes
• Entrepreneurial Leads who are interested to join the teams

An interview will be arranged to visit the lab and better assess the technology for its suitability and readiness for the programme. Minimum acceptance criteria: Technology Readiness Level (TRL) of 3.

For any queries, including anyone interested to join as mentors, please email: susankheng@nus.edu.sg
LEAD FACULTY
Prof Wong Poh Kam, Director, NUS Entrepreneurship Centre

Prof Wong teaches Entrepreneurship and Innovation Strategy at the NUS School of Business. As Director of NUS NEC where he spearheads the university’s entrepreneurship education and outreach programs. He also oversees the NUS Enterprise Incubator (NEI) program that provides incubation, seed funding and mentorship to NUS-related spin-offs and startups. An entrepreneur who co-founded three companies prior to joining academia, he is an active angel investor with investment in more than a dozen high tech start-ups in Singapore, Silicon Valley, China and India. Prof Wong obtained his PhD from MIT.

TRACK FACULTY, ENGINEERING, LLP@SG
Adjunct A/Prof Neo Kok Beng
NUS Business School, Faculty of Engineering

Prof Neo is a Technology entrepreneur specializing in the commercialization of technologies from universities and research institutes. He is co-founder and CEO of AWAK Technologies, a medtech spin-off from UCLA. His ventures include investments in info-security, mobile computing and 3D printing. He is also on the Faculty of Innovation for Economic Development at Harvard Kennedy School, as well as faculty and academic committee member of Singapore-Stanford BioDesign Programme. Kok Beng is the current Vice-President & Fellow of the Institution of Engineers, Singapore.

TRACK FACULTY, ICT LLP@SG
Adjunct A/Prof Virginia Cha
NUS Business School

Virginia is an active researcher, educator, mentor and angel investor in Singapore’s entrepreneur ecosystem. In her 32 years of executive management in technology companies, she was chief technology geek at a US multinational tech company as well as co-founder and CEO of multiple venture-funded, hi-tech companies in Singapore and China with successful exits on NASDAQ and HKSE; Virginia recently published her first book on “Asia’s Entrepreneurs: Dilemmas, Risks and Opportunities” on Singapore’s recent history and current development in technology entrepreneurship development.
Prior to NUS, Dor Ngi was involved in the inception of 2 biotechnology startups, covering the functions of CTO and CEO, and in incubation management of spin-offs originating from research institutes. Dor Ngi’s industry experience spans across various parts of Singapore’s innovation ecosystem value chain, including corporate R&D of MNCs, startups, educational and research institutes and technology transfer offices. Her current function leverages on her wide network of partners and deep knowledge of the ecosystem to support technology commercialization activities. She holds an EMBA from NUS.

Steve Blank is the creator of the Lean Launchpad programme and also the author of “The Start-Up Owners Manual” and the “Four Steps to the Epiphany”. He is an entrepreneurship faculty member at U.C. Berkeley, Stanford University and Columbia University. A serial entrepreneur, he was part of/or founder of 8 Silicon Valley start-ups.

Jerry is a veteran entrepreneur in Silicon Valley. After a successful career advising and founding entrepreneurial ventures, he joined the University of California at Berkeley in 1991 to found the Lester Center for Entrepreneurship. Jerry is an Adjunct Professor at the Haas School of Business and instructs in both the School’s MBA and Executive education programs.