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#### What some Reviewers have to say ...

"These inspiring stories about the 557 NTI pioneer engineering graduates illustrate the versatility of an engineering education and how engineers contribute in many different ways to Singapore's development and the well-being of Singaporeans. Engineers turn dreams into reality."

#### TEO CHEE HEAN

Deputy Prime Minister Coordinating Minister for National Security Minister for Home Affairs Republic of Singapore

[DPM Teo is currently the most senior politician in Singapore with an engineering background. He has been the Minister for Defence, Education, and Environment. He studied Electrical Engineering and Management Science at the University of Manchester Institute of Science and Technology (UMIST). He recalls that in the 1980s, then-Minister for Education, Dr Tony Tan had called him to understand the relationship between the University of Manchester and UMIST as a model for NTI to award a joint degree with NUS. He served on the NTI/NTU Council from 1988 to 1992, during which NTI became NTU in 1991. In 2003, the decision to have NTU evolve into a comprehensive university was made when he was Minister for Education.]

"This book is an excellent work that provides a human face to Singapore's economic development story. The rewarding careers and contributions of a generation of engineers underscore the importance of building a solid foundation for Science, Technology, Engineering and Mathematics in our Singapore education system."

HENG SWEE KEAT

Minister for Education
Republic of Singapore

"An excellent and beautiful presentation of the miraculous growth of NTU and the fascinating career journeys and accomplishments of NTI engineering pioneers. This book will inspire many to take up engineering and contribute to society and nation."

#### PROFESSOR EMERITUS CHEN CHARNG NING

Founding Dean School of Civil & Structural Engineering Nanyang Technological Institute

"Congratulations for a book that chronicles the history of NTI's first batch of practice-oriented engineers. Their success in different fields contributed much to the Singapore economy and society. May more alumni contribute to their alma mater's academic excellence and global prominence."

#### PROFESSOR BRIAN LEE

Founding Dean School of Electrical & Electronic Engineering Nanyang Technological Institute

"Inspiring and refreshing. The inside story of the 'builders' behind Singapore's development over the past 25 years. This book showcases a startling diversity of careers that an engineering degree unlocked. A must-share with the children in your life!"

#### PROFESSOR JANIE FOUKE

Dean of College of Engineering Nanyang Technological University

[Professor Fouke is a biomedical engineer by training.]

"This book showcases the varied careers of some 500 successful engineers. Their rich experiences show beyond doubt that engineering is a versatile discipline and the most fulfilling and meaningful profession. Engineers are creators, innovators, builders and problem solvers. They make dreams come true. Join us."

#### TAN PHENG HOCK

President & CEO Singapore Technologies Engineering Ltd

[ST Engineering is a global defence and engineering company in the aerospace, electronics, land systems and marine sectors. A marine engineer by training, Pheng Hock also serves on the Advisory Board of the School of Mechanical and Aerospace Engineering at NTU. The board provides guidance in the area of the curriculum and direction of the school, something that Pheng Hock is passionate about. This will ensure that the courses remain relevant to the industry.]

"The book is an excellent effort. It is heartening to read a well curated set of stories on a pioneering batch of engineers who have gone into a wide range of professions. This book sheds light on the challenges of Singapore's earlier development, and will inspire a new generation of engineers and leaders."

TAN GEE PAW
Chairman

[A civil engineer by training, Mr Tan Gee Paw has been the Chairman of the Governing Board of the Earth Observatory of Singapore at NTU since 2008. In 2011, he became a panel member of the Nanyang Environment and Water Research Institute Advisory Board. He was a board member of the previous NTU-Stanford Management Board as well as on the advisory panel of the previous NTU Clean Water Programme.]

"The personal stories in this book are truly inspiring and reinforce the fact that engineering is a versatile and meaningful profession. They brilliantly demonstrate that engineering is an engine of innovation, a point often overlooked today. Engineering is a key enabler from which innovation flourishes and permeates many facets of our lives. It plays a vital role in enhancing Singapore's defence capability."

#### TAN PENG YAM

Chief Executive Defence Science & Technology Agency

[Mr Tan Peng Yam is an electrical engineer by training. He serves as a board member of the Temasek Laboratories @NTU, a collaboration between DSTA and NTU to develop specific technology that will deliver effective solutions to enhance the defence and security of Singapore.]

"These stories are shining examples of NTI pioneers applying the lessons of engineering with variety and versatility in their diverse careers. Engineering is the cornerstone of any successful society. An engineer's greatest satisfaction is realising one's vision. I hope many others will join us on this immensely rewarding journey and turn visions into reality."

TANG KIN FEI

Group President & CEO Sembcorp Industries

[Mr Tang is a mechanical engineer by training. He was formerly a member of the Advisory Committee of the ENV-NTU Environmental Engineering Research Centre.]

"Engineers play a pivotal role in the development and transformation of Singapore. They have built the past, are engineering the present and will bring to reality the vision of the future. Our NTU pioneers epitomise the spirit of Singapore and Engineering."

#### PROFESSOR LOW TECK SENG

Managing Director Agency for Science, Technology and Research (A\*Star)

[Professor Low is an electrical and electronic engineer by training.]

"These inspiring stories demonstrate the versatility of an engineering education. There are simply no boundaries except one's interest, passion, and imagination. All around us are countless engineering endeavours that bettered our lives. This book will inspire future talents to make a difference through engineering."

#### WONG NGIT LIONG

Chairman & CEO Venture Corporation

[Mr Wong Ngit Liong is an electrical engineer by training.]

"A well-documented story of the NTI pioneers' great 25-year adventure. I feel their excitement, fear, joy, sadness, wonder, pride and courage. Makes me proud to be an engineer."

#### LEE KOK CHOY

Managing Director, Fab 7 Micron Semiconductor Asia Pte Ltd

[Mr Lee Kok Choy is an electrical and electronic engineer by training.]

"I strongly recommend this book for young talents seeking an inspiring career in engineering. It documents some of the engineering graduates from the NTI pioneer batch who have excelled in a wide range of careers. They are among the engineers who helped propel Singapore to a first world country within a miraculously short time."

#### LIEW MUN LEONG

President & CEO Capitaland Limited

[Mr Liew Mun Leong is a civil engineer by training.]

"A most invaluable tribute to the engineering profession. Engineers enhance the quality of life, raise the standard of living, and create jobs and wealth. A vivid affirmation of their contributions through the life stories of the NTI pioneers."

QUEK GIM PEW

DSO National Laboratories

D3O National Laboratories

[Mr Quek Gim Pew is an electrical engineer by training.]

"A commendable initiative and timely guide for the next generation. The pioneers' vast experiences highlight engineers' ability to overcome challenges and the infinite possibilities open to them."

ER TAN SENG CHUAN

Past President (2006 – 2008) Institution of Engineers, Singapore

[Er Tan Seng Chuan is a civil engineer by training.]

"Students thinking of a tertiary education should read this informative and interesting book. It could change your course and future. It shows the resilience of the NTI pioneers and their impact in various fields. A true depiction of the diverse pathways open to students who pursue an engineering education."

### LAY-TAN SIOK LIE

Deputy Principal Temasek Polytechnic Chairperson Committee Promoting Engineering Education in Polytechnics

[Mrs Lay-Tan is an electrical and electronic engineer by training.]

"A timely book. Engineers are problem solvers who are grounded in reality and inclined towards action. Now, more than ever, may the 'let's-take-on-the-world' spirit of the NTI pioneer class inspire a new generation of engineers to take Singapore forward."

AW KAH PENG
Chief Executive
Singapore Tourism Board

[Ms Aw Kah Peng is a chemical engineer by training.]

"For some time, the popularity of an engineering education has fallen behind that of other courses because of a myopic view of the profession. This book goes a long way to illustrate the varied career paths of the pioneering NTI class. It should inspire more students to take up engineering, a tough but well-rewarding choice. We should remember the Chinese idiom 'Bitterness ends, Sweetness begins' (苦尽甘来)."

ALAN CHAN
CEO
Singapore Press Holdings

Singapore riess riolanigs

[Mr Chan is a civil aviation engineer by training.]

"An inspirational book that captures many personal experiences of engineers who made a difference. Engineers today have many diverse and exciting opportunities in Singapore's globally competitive economy to create, innovate and impact society positively. Their technological breakthroughs enable solutions to problems, generate new business, build new capabilities and improve lives. To be an engineer is to create a better world for the future "

LEO YIP
Chairman
Economic Development Board

"Anyone thinking of the versatile field of engineering will find this book interesting and informative. The engineering profession has never been known to be glamourous nor sexy but it continues to attract the best and brightest simply because of its importance to society. Graduates can pursue many avenues of opportunities outside the main discipline. Surbana is proud to have been able to play a part in the lives of the NTI engineering graduates then, now and, I have no doubt, in the future as well."

LIM JIT POH

Chairman
Surbana Corporation

"An excellent initiative. The multi-disciplinary fields pursued by the NTI pioneers show the versatility of an engineering degree adapting to an evolving world. This easy-to-read book is an encouragement to youths and a point of reference for the future."

#### DR R. THEYVENDRAN

Chairman & Managing Director Stamford Media International Secretary-General Management Development Institute of Singapore

# WHAT SOME JUNIOR COLLEGE / YEAR 6 PRINCIPALS HAVE TO SAY ...

"Singapore needs more entrepreneurial leaders to ride the next wave of hi-tech growth. This book not only celebrates the pioneering spirit of NTI's engineering graduates, it will also inspire succeeding generations to break new grounds and create wealth for the country."

#### DR HON CHIEW WENG

Principal Hwa Chong Institution

"Congratulations on the publication of a book that illuminates and inspires! The many and varied accomplishments of the NTI engineering pioneers strikingly illustrate the importance of availing different educational pathways to our students. People learn in different ways, and it is when we customise programmes to their needs that we maximise the educational and social outcomes for Singapore."

LIM LAI CHENG
Principal
Raffles Institution

"A comprehensive book that records the accomplishments and struggles of the 1985 NTI pioneers. Engineers have played a big part in shaping Singapore's future and economy. These NTI pioneer engineers have also trail blazed in their own ways."

LOKE-YEO TECK YONG

Principal Temasek Junior College "The unfolding narratives show how the Man and Woman engineers conceptualized, built and created modern Singapore. I encourage students who are inclined towards engineering to become engineers. Listen to your heart and follow it. It is your choice, your life."

## HELEN CHOO CHIEH CHEN

Principal Tampines Junior College

"Highly interesting and informative read on the myriad achievements of engineering graduates! I strongly recommend this book to all River Valley High School students. Kudos to the authors for this inspiring book."

STEVEN KOH YONG CHIAH

Principal River Valley High School

# DEGREE MANY CHOICES



#### ABOUT THE NTU ALUMNI CLUB

Headquartered at the clubhouse in One North, Bouna Vista, the NTU Alumni Club facilitates business networking and continuing education for graduates within its fraternity. Widely recognised for its pioneering roles in technology advancements and innovative ventures, the NTU and its alumni play a fundamental role of developing a generation that will serve the nation well into the 21st century and beyond.

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# DEGREE MANY CHOICES

# A GLIMPSE INTO THE CAREER CHOICES OF THE NTI PIONEER ENGINEERING CLASS OF 85



Edited by

#### LIU FOOK THIM

Chairman Book Committee

NTU Alumni Club Publication





INSTITUTE OF SOUTHEAST ASIAN STUDIES SINGAPORE

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# WHAT THIS BOOK IS ABOUT

"My daughter Sarah is into her third year of the Mechanical Engineering programme at NTU."

— Florence Tan Sok Bee, MPE Pioneer



N DECEMBER 2010, THE CLASS OF 85, the pioneer batch of Nanyang Technological Institute (now known as Nanyang Technological University), celebrated the 25th anniversary of their graduation with a dinner. The question most frequently asked was "Hey, what happened to you all these years?" It was this question that sparked the idea of producing a book to capture our career paths.

The passage of 25 years yielded deep insights as we looked back on our engineering education. Most of us are about 50. Some of our children are already in campus. "My daughter Sarah is into her third year of the Mechanical Engineering programme at NTU. She is following in my footsteps," declared Florence Tan Sok Bee proudly. It is time to ponder the next lap and prepare to hand the baton over to a younger generation of engineers.

Producing this book was exciting but far from easy. Tracking 557 pioneers was a challenge. Even when we did reach them, convincing them to share their life stories was no mean task. Some inspired ones contributed but others valued their privacy.

Credit goes to R. Sinnakaruppan, President of the NTU Alumni Club. A key mover behind the book, he sees the timeliness of this endeavour. A member of the board of several tertiary institutions, he is aware that engineering is no longer the degree of choice. Considering how Singapore's success is founded on the infrastructure laid by engineers including the NTI pioneers, the need to inspire future generations to take up engineering is a pressing matter. Engineers are crucial to any thriving economy.

Over the years, finance-related courses have replaced engineering as the course of choice. This seems inevitable given Singapore's status as a regional financial hub riding the Asia boom. Pragmatic young Singaporeans flock to where the money is, more so when the course is less demanding vis-à-vis engineering. The selection of university courses has become market-driven.

Still, where the bank balance is concerned, the starting pay for engineers is not too bad. The 2009 Graduate Employment Survey showed that 90 per cent of NUS and NTU civil, electrical and mechanical engineering graduates earned some \$3,000 a month. That is \$500 more than a business or science graduate. This premium will be sustained in a technology-driven global economy. However, for the NTI pioneers, money is but one considering factor. Hindsight tells them that factors such as a stimulating job, work-life

balance and employer's reputation are also important. Their unanimous mantra: Life is short. Be true to yourself.

So far, efforts have been made to revive interest in engineering talents. Recently, the Economic Development Board invested in an eight-week *Straits Times* spread. Every week, it featured a prominent engineer in the industry. The Institute of Engineers Singapore invested in workshops with secondary schools. Our approach in this common drive is to use the life stories of our cohort to inspire the reader towards engineering.

This book is written with the 16- to 18-year-olds in mind. It is written in a way that is easy to read. It is a story book and not a history book. Each chapter is capped at six pages. This book is not an attempt to TELL them what to do. We want the sharing of our life stories to inspire them to choose engineering on their own accord. Time and again, these stories illustrated the versatility of an engineering education. It provides plenty of career options besides engineering. The book title sums up this key strength — *One Degree, Many Choices*. We also want to create awareness among their parents and teachers who are influential in shaping future careers.

This book does not promise ten easy steps to a prominent engineering career. It offers no quick fix for the traumas of business cycles as companies downsize and engineers are affected. This book is not about the motivation behind our decision to study engineering either. The focus is on our careers after graduation. We do not want to digress from the main goal of getting the reader to see the career benefits of an engineering education. The book comprises five sections.

Part I covers events from the birth of NTI to the graduation of the first cohort in 1985. We interviewed founding President Professor Cham Tao Soon and founding Council Chairman Dr Michael Fam for their insights.

Part II, the body of the book, is a thematic treatment of the career choices of NTI pioneers who pursued an engineering career. It opens with the semiconductor industry upon which many NTI pioneers built their careers. The semiconductor was the foundation for the computer revolution.

Every chapter gives an overview of the industry. An overview of the Singapore economy over the past 25 years is provided in Appendix I. It is needed as the pioneers' life stories are intertwined with the developments in the Singapore economy. Knowledge of the latter gives the context to better understand these stories.

Part III features the 56 gutsy lady NTI pioneers who stand out in a male-dominated environment.

Part IV showcases the non-engineering pursuits of many NTI pioneers, providing ample proof of the versatility of an engineering education.

Part V is the Epilogue. The NTI engineering education in the 1980s is a far cry from the one today at NTU. We have interviewed the current leaders of NTU to get their thoughts on the future of engineering education. The book ends with nuggets of advice for the aspiring undergraduate.

If this book inspires some to take up engineering education in general and at NTU in particular, it will have achieved its purpose.

## **FOREWORD**



HE BOOK *ONE DEGREE, MANY CHOICES* captures the impact of a government policy made 30 years ago. I have a long association with the Nanyang Technological University (NTU) starting from its inception, and subsequently in various capacities as the Minister for Education, Minister in charge of university education, and as Chairman of the International Academic Advisory Panel and Chairman of the National Research Foundation.

NTU began as a response to a need. In July 1980, the Council on Professional and Technical Education identified the need to significantly increase the number of engineers in Singapore to enable our economy to shift to more high-technology, high value-add activities.

To meet this need, the Council proposed, and the Government approved, the establishment of a new institute. Nanyang Technological Institute (NTI) — NTU's predecessor — was set up in 1981 with three engineering schools to educate

practice-oriented engineers to run the industries that power our economy.

As Singapore grew and prospered, NTI evolved to become NTU. NTU went from being a teaching university to one with strong emphasis on both education and research.

Investing in higher education has been an integral part of our strategy for economic growth and nation building. It enables our people to fulfil their potential and equips them with the skills, knowledge and motivation to seize the future. I am heartened to read the detailed contributions of the NTI pioneers in virtually every industry that is vital to Singapore's development.

The book is unique because it is not about one person but a cohort. The life stories of the pioneer batch of NTI engineering graduates mirror the economic development of Singapore over the past 25 years. During this period, the Singapore economy went through structural changes as old industries were retired and new growth sectors developed. The pioneer batch of NTU engineering graduates have adapted well and made an impact on society.

The world is now significantly different. There is more competition given the rise of China and India. There are also many new opportunities for Singapore and Singaporeans today. Engineering talent is still relevant to help us innovate and adapt, and seize these new opportunities in the region and world around us. Hence, it is important that some of our most talented young people continue to view engineering as a discipline of choice.

I hope this book will inspire current and future batches

of engineers in a world that is significantly different from 30 years ago. I congratulate all those who have been involved in the production of this book and applaud their contributions to our country.

### TONY TAN KENG YAM

President Republic of Singapore

## ACKNOWLEDGEMENTS



RESEARCHING THE BOOK gave us the opportunity to catch up with old friends, many of whom we have not seen for years. Most were willing to give their inputs — an affirmation of the bonds forged during the three years on campus. We thank them for their strong encouragement.

We put on record our deep appreciation to President Tony Tan for penning the Foreword. Professor Cham and Dr Fam were generous with their time in sharing their insights on the birth of NTI. They were forthcoming in sharing little-known events that were previously not convenient for disclosure. We are grateful to NTU Board of Trustees Chairman, Koh Boon Hwee and NTU President, Professor Bertil Andersson for their inputs on NTU engineering education going forward.

We want to also thank the NTU Alumni Office for sharing with us pertinent data related to the 557 graduates from the Class of 85.

A number of people have taken precious time to review the book. We deeply appreciate their kind words and encouragement.

### Acknowledgements

Finally, we are indebted to those who submitted their profiles and critiqued the book. Some even managed to get their children who are in the target age group to review the book. They believe in leaving a legacy worthy of the NTI Pioneer Engineering Class of 85. Thank you.



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#### INTRODUCTION

# IT'S ALL ABOUT LIFE CHOICES

"Engineering opened many doors for me."

— Alan Lim Kok Seng, MPE Pioneer



ANYANG TECHNOLOGICAL UNIVERSITY (NTU) pioneer Alan Lim Kok Seng's engineering degree was his passport to more than 100 cities in Asia, Europe and the Americas over two decades. Names such as Beijing, Shanghai, Taipei, Hong Kong, London, Paris, Sao Paulo, New York and Washington rolled off easily from the tongue of the 49-year-old former ExxonMobil global marketing manager. "My Beijing posting in 1995 put me on the global career circuit and started my 12-year overseas stint. It was a rollercoaster ride and my family just went along without knowing our next destination," said Alan who graduated from the School of Mechanical and Production

Engineering (MPE) in 1985. He was among the first batch of 557 engineering graduates from the Nanyang Technological Institute (NTI) as NTU was known then. At that time, engineering was the only discipline offered by NTI.

Engineering opened many doors for Alan. For one thing, ExxonMobil recruited him during a campus job fair. He credits his NTI training for preparing him for career opportunities ranging from engineering, operations, marketing to sales at ExxonMobil. "The structured mind of an engineer will perform far beyond the ambit of the engineering field, and if blended with some marketing, business and finance training, can be a potent combination in achieving one's career aspiration," said Alan.

This book is the story of the career decisions of a group of ordinary people bonded by the common distinctive of being pioneers in a new university, a practice-oriented one. When they graduated in 1985, Singapore went into a recession after 20 years of growth. The graduates walked into a world of downsizing, re-engineering and restructuring, a phenomenon that has become the norm in recent years. Their diverse experiences over the last 25 years will be instructive for aspiring engineers.

The characters in this book aren't geniuses. They don't have magical powers. These are engineers most of whom are singularly ungifted at what you may call brand management. Some chose fame and scaled the heights in the political and commercial arenas. Some chose a simple life and appreciate the sweet balance between family and work. Many have gripping tales to share, be it the joy of entrepreneurial success or the pain of job loss. Others bit the bullet, changed

careers and got on with life. The versatility that they picked up in NTI held them in good stead in an uncertain economic climate.

Life is about choices. The pioneer batch of 1985 made theirs and you are about to make yours. The engineering degree specifically prepared the first batch of graduates for their careers. If you are thinking about a university degree and aspire to take up engineering as a career, this book is for you. May you be inspired to emulate the pioneering spirit of your predecessors in a globalised and challenging environment.