



Asian Scientists on the Move

The growing scientific research output from Asia has been making headlines since the start of the twenty-first century. But behind this science story, there is a migration story. The elite scientists who are pursuing cutting-edge research in Asia are rarely “*homegrown*” talent but were typically born in Asia, trained in the West, and then returned to work in Asia. *Asian Scientists on the Move* explores why more and more Asian scientists are choosing to return to Asia, and what happens after their return, when these scientists set up labs in Asia and start training the next generation of Asian scientists. Drawing on evocative firsthand accounts from 119 Western-trained Asian scientists about their migration decisions and experiences, and in-depth analysis of the scientific field in four country case studies – China, India, Singapore and Taiwan – the book reveals the growing complexity of the Asian scientist migration system.

ANJU MARY PAUL is an international migration scholar with a research focus on emergent migration patterns to, from and within Asia. Her previous books include the award-winning *Multinational Maids: Stepwise Migration in a Global Labor Market* (Cambridge University Press 2017) and *Local Encounters in a Global City* (Ethos Books 2017).

Asian Scientists on the Move

Changing Science in a Changing Asia

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*To
Appa and Amma,
who returned to India when they did not have to
and
who taught me what a life of service looks like*

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Preface

When nonacademics ask me why I chose to research the migrations of Asian academic scientists, I usually tell them that I had been intrigued by the news stories about the “rise” of Asian science which began appearing with increasing regularity from the early 2000s. The fact that I am a returned academic migrant myself is not something I share, even though my personal experience of return migration played a big part in my decision to study the brain circulations of Asian-born, Western-trained bioscientists.

While I was born in India and am an Indian citizen, I moved to Singapore in 1992 when I was sixteen – after winning a Singapore government scholarship – to complete the last two years of my high school education. My parents supported my pursuit of this scholarship as they recognized that my interests did not fit well with the rather rigid educational tracks that existed for middle-class youth in India at the time, where medicine and engineering were often deemed to be the only acceptable pursuits for academically gifted youth. After I finished high school in Singapore, I won another scholarship to pursue an undergraduate degree in Singapore, but this time it came with a service bond with Singapore Airlines that required me to work for the company for six years after graduation. I was drawn to the idea of funding my own college education without having to ask my parents for financial support, so I accepted the scholarship. After graduating from the National University of Singapore (NUS) with a first-class honors degree in Business Administration, I worked in Singapore Airlines for five years as a management executive.

It took me a while to figure out what I wanted to do with my life and, in the spirit of exploration, I left Singapore in 2003 to pursue a graduate degree in journalism in the USA. I never imagined that I would return to Singapore years later. After my master’s, I stayed on in the USA to pursue a doctoral degree in sociology and public policy. My doctoral dissertation focused on the stepwise migrations adopted by

Filipino migrant domestic workers who seek to reach countries higher up their destination hierarchy – often countries in the West – by working in various “stepping stone” countries for several years at a time. When successful, this stepwise migration allows these capital-constrained migrants to accumulate resources and work experience, which they can leverage to climb up their destination ladder.¹ The year I was finishing my dissertation, I heard about a new liberal arts college being set up in Singapore as a partnership between NUS and Yale University. Yale-NUS College was hiring faculty across the humanities, and the social and natural sciences. I applied, hoping that my prior connection to Singapore and my research on Asian migrations would make me a strong candidate. I received an offer to join Yale-NUS as an assistant professor and returned to Singapore in 2013 as a freshly minted academic with my husband and two young children in tow.

Working at a brand new liberal arts college housed within a public research university considered one of the top universities in Asia, gave me the opportunity to witness firsthand the rapid changes underway in tertiary education in Singapore and elsewhere in Asia. While universities in the USA and much of Europe were complaining about declining state support for higher education,² many Asian governments were pumping more and more funds into raising the research profile and world rankings of their national universities.³ They were also actively recruiting Western-trained Asian academics (mainly in the sciences) back to their shores. Seeing these efforts piqued my curiosity and instigated this book project. What made an Asian scientist living in the West uproot themselves (and, in some cases, their families) and move back to Asia? Were there other academics like me – born in one Asian country but “returning” to work in a different one? Was return to a rapidly changing Asia a sign of failure on the part of the returning scientist, or a sign of their ambition? These were the questions I wanted to explore with this project.

But there was another return story that informed my research. This was my parents’ return migration to India when I was a teenager.

My parents are both medical doctors – my father is a gynecologist, while my mother was trained as a radiotherapist. Born in the southern

¹ Paul 2011, 2017.

² Hyatt et al. 2015.

³ Paul and Long 2016; Knight 2008; Marginson et al. 2013.

Indian state of Kerala to a tenant farmer, my father was the second oldest of nine siblings. He had always been bright in school and, early in his life, he encountered mentors who guided his education trajectory and pointed him towards medicine as a career. After finishing high school, he sat for the Kerala state entrance examinations and was accepted into Kottayam Medical College, a government-run medical school in central Kerala.

My mother came from a more well-to-do family. On her maternal side, her grandparents owned a local bank as well as large swathes of land in the center of the state. Her paternal grandparents traded in spices. Meanwhile, my mother's parents were both English teachers, and believed in the importance of education for all five of their children. My mother, the oldest child, was encouraged to aim as high as possible and she chose to pursue medicine, earning a place at Christian Medical College (CMC) in Vellore in the neighboring state of Tamil Nadu. CMC had been set up by American missionaries during the British colonial period and, in the 1960s, was considered one of the top medical colleges in the country.

My parents met and married after they completed their medical training in the late 1960s. Both joined the Kerala government's medical college system to work in public medical college hospitals, where they practiced medicine and taught the next generation of Kerala's medical doctors. Every few years, they would be rotated to a different medical college hospital in a different part of the state and provided government quarters to live in. During this time, they also gave birth to two daughters – my older sister and myself. But the idea of migrating westward for further training was always a dream at the back of their minds.

By this time, the USA had opened up its immigration system to allow highly educated professionals from Asia (and elsewhere) to enter the country,⁴ and there was a mad rush among Indian doctors to apply for jobs in America. By the late 1960s, the Indian government had become so concerned about this “brain drain” that it banned the USA from conducting its medical certification examinations – the Entrance Certificate for Foreign Medical Graduates – within the country.⁵ Interested Indian doctors had to travel to neighboring countries in

⁴ Donato and Amuedo-Dorantes 2020.

⁵ Bobb 1977.

order to sit for these qualifying examinations. My father borrowed money from friends to fly to Sri Lanka to take the exam. He passed, received a job offer from a hospital in Texas, and was issued an immigrant visa by the US embassy in Madras (now known as Chennai) in southern India.

But my father was not interested in settling down in the USA. His plan from the very start was to train overseas and then return home. Worried that going to the USA on an immigrant visa would encourage him to settle permanently in the West, he eventually turned down the job offer. My parents ended up working in India for another three years, slowly rising through the ranks within the local medical college system. But my father's dream of pursuing advanced training in the West remained. In 1977, the United States tightened its immigration process for foreign-trained doctors, but the United Kingdom (UK) did not yet require Indian-trained doctors to clear additional certification tests. So my father decided to go to the UK instead.⁶

My father's first job in the UK was a temporary one in a hospital near Belfast in Northern Ireland. He traveled there on his own in 1980 while my mother, my sister and I stayed behind in India. After his Belfast stint, he landed a permanent job in Edinburgh in Scotland and sent for us to join him. We arrived in Scotland in late 1980 and spent three happy years in Edinburgh with my mother choosing to become a stay-at-home wife. My brother was born in Edinburgh, while I picked up a thick Scottish accent. At work, my father rose from resident to senior resident, and was offered a one-year position as a consultant, which was the most senior rank for doctors at his hospital. Such temporary consulting positions often led to a permanent one. Once again, he understood that if he accepted this offer, we would most likely settle down in the UK and not return to India. And so, my father chose to accept a position as head of department in a brand new hospital in the city of Dammam in the Eastern Province of the Kingdom of Saudi Arabia. We left the UK and moved to Saudi Arabia in 1984.

In the early 1980s, Saudi Arabia was still in the midst of its massive development boom as a result of the 1973 oil price hike initiated by the

⁶ In the 1950s and 1960s, the UK had recruited Indian doctors in large numbers. Though the volume of this migration stream shrank in the 1970s, it was still relatively common and certainly aspirational for Indian doctors to engage in westward migration to the former colonial "metropole" in order to seek further training.

Organization of Petroleum Exporting Countries, and the further price increase after the Iranian Revolution in 1979. Saudi Arabia was building infrastructure at a furious pace and importing large numbers of foreign manpower to build this infrastructure. Lacking a native-born educated professional class, Saudi Arabia was hiring high-skilled foreign labor as well, initially from other countries in the Middle East, but increasingly from South Asia. My father was part of the first wave of educated Indian engineers and doctors who moved to Saudi Arabia and other oil-rich Arab countries in the 1980s, attracted by the high salaries, good benefits, zero income taxes and proximity to India. We stayed in Saudi Arabia for six years and, while I missed my friends in Edinburgh, I enjoyed my sheltered life in Dammam as well. We were embedded within a large and vibrant Indian expatriate community, lived in an apartment building where all of our neighbors were other Indian doctors and their families, and went to an Indian school that followed the Indian curriculum.

After six years in Saudi Arabia, my parents decided that it was time for us to return to India. I did not know this at the time but they had taken a ten-year leave of absence from their state government jobs, and they were reaching the end of their leave period. They needed to return if they still wanted to access their civil service pensions. In addition, they wanted to be closer to their extended family in Kerala as their own parents were getting old. And perhaps most importantly, my father had never given up on his desire to return to work in India where he felt that the need for his skills and training was the greatest.

In early 1990, my mother returned to India, taking us children with her. Meanwhile, my father stayed on his own in Dammam for a few more months to finish out his contract. Saddam Hussein invaded Kuwait soon after we left. I interpreted the subsequent Gulf War as a sign that our family's time in Saudi Arabia should come to an end. After my father returned to India, we settled down in the town of Thrissur in central Kerala, where my father served initially as Associate Professor, and later as Professor and Head of the Department of Obstetrics and Gynecology, at Thrissur Medical College. I had never been interested in medicine as a career, but I would learn from conversations over the dinner table about the challenges and joys he experienced practicing and teaching medicine in India. His government college hospital was always short of funds, so

my father learned to innovate new medical procedures and design new surgical instruments under tight budget constraints. As department head in Thrissur, he introduced many of the operating procedures and management practices he had learned in Scotland. Over the years, he trained successive generations of young Indian doctors to approach the practice of obstetrics and gynecology in a more systematic and research-driven manner. He was sometimes frustrated as departmental politics were always present, but it was also an incredibly rewarding experience. He later established the first state-wide confidential review of maternal mortality in India, leading to a significant decline in maternal deaths throughout Kerala.

Outside of work, my father would complain about the inefficiencies of the Indian government bureaucracy and the rule-breaking behavior of Indian drivers. A stickler for honesty, he hated the fact that black money was widespread throughout the Kerala economy and that too many people seemed to be on the lookout for a kickback or a handout.⁷ My mother meanwhile found it hard to adjust to working-life back in India after ten years of not working and so took early retirement, devoting her energy to managing the household and my father's parallel private practice.

I did not stay long in India. As mentioned earlier, I won a scholarship that took me to Singapore at the age of sixteen. From Singapore, I moved to the USA where I met and married my husband, and had two children, before eventually returning to Singapore. Many of the themes I raise in this book – scientific remittances, gender compromises, scientific cultures, the tension between private ambition and national duty – had parallels in my parents' return migration story as well as my own. The focus of this book – the change in Asia's position within the global scientific field – was only just beginning when my parents returned to India in 1990, but it was in full swing by the time I returned to Singapore in 2013. At its heart, *Asian Scientists on the Move* is about the “things” – aspirations, plans, ideas, values, preferences, perspectives, connections, and knowledge – picked up and carried by circulating migrants and how these social remittances inevitably affect the culture of the communities these

⁷ “Black money” refers to illegally earned income that is not declared in income tax filings.

migrants return to when they come “home.” For that reason, I hope that this book will resonate with the many Asians – like my parents and I – who left their home countries to pursue education and careers in the West, and the increasing number of Asians – again, like my parents and I – who are choosing to come back.

Acknowledgments

This book project has been a long time coming. But none of it would have happened without the generous funding support I received from the Global Asia Institute (GAI) at the National University of Singapore (NUS). Gavin Jones, who headed the GAI at the time I moved to Singapore, was a kind and open-minded supporter of ambitious research projects. He let me take this project in unexpected ways and always ensured that there was additional funding to support my expanding research goals. Likewise, Yale-NUS College generously stepped in to provide a bridging grant when I finally ran out of GAI money before I had finished my fieldwork.

Conducting the fieldwork for this project was so much fun, even as it was exhausting. Over the course of four years, I traveled to India, China, Taiwan and the United States to conduct interviews and visit various research centers associated with the life sciences. In Singapore, I conducted my interviews at NUS, Nanyang Technological University (NTU), and Biopolis, and became intimately familiar with the geographies of their respective campuses. In Taiwan, I spent time at the Academia Sinica campus, visiting various life science institutes, as well as the campuses of National Taiwan University in Taipei and the National Health Research Institutes in Miaoli County. In China, I visited various Chinese Academy of Sciences (CAS) institutes across Beijing. And in India, I conducted face-to-face interviews in Bangalore at the National Centre of Biological Sciences (NCBS), the Indian Institute of Science (IISc) and other research institute campuses. In order to reach further afield in all four of my Asian case countries, I also conducted Skype interviews with scientists in other locations. This was how I conducted most of my US interviews which were scattered throughout the East Coast, the West Coast, and also the Midwest. I continue to be humbled by the generosity of all the scientists I interviewed. They opened their offices and labs to me, they introduced me to their spouses and they told me about their childhood

joys and professional challenges. It is because of them that this project took the shape it did, and became much more interesting than I could have ever hoped.

Supporting me while I conducted this fieldwork was a group of stalwart research assistants: Xiao Yun, Li Qin, Pearlyn Neo, Victoria Long, Simonas Bartulis, Nanlan Li and Regina Hong. All were fully committed to the project and each brought their particular strengths and enthusiasms to the endeavor. Later, Anastasiya Varenysya was invaluable in the copyediting of the final manuscript. Even my children, Sebastian and Paloma, helped with some of the data analysis, while Sebastian read through the entire manuscript and gave me useful feedback.

Among my faculty peers, I have benefited from countless conversations with many interlocutors over the years. At Yale-NUS, I presented chapter drafts to the Gender Research Cluster and the Race, Ethnicity and Migration Cluster, and I am grateful to Huey Shy Chau, Nienke Boer, Gretchen Head, Christine Walker, Cecilia Van Hollen, Gabriele Koch, Kurt Kuehne, Robin Zheng and Zachary Howlett for their insightful comments and suggestions each time I shared my work with them. My life science colleagues at Yale-NUS – Eunice Tan and Ajay Sriram Mathuru – kindly read an early draft of Chapter 6 and gave me helpful feedback. I also presented my work at external venues through the kind invitation of academics whom I respect and admire. Monamie Bhadra Haines, Hallam Stevens and Ian McGonigle invited me to present my work on scientific cultures at NTU in Singapore; Johan Lindquist invited me to give a talk on the trailing wives of returning Asian scientists at the University of Stockholm; Sanna Saksela invited me to the University of Helsinki to present my research on the gender compromises made by Asian women scientists; Hein de Haas, Mathias Czaika and Sorana Toma invited me to a workshop at Oxford University to talk about my initial findings on changing training patterns among aspiring Asian scientists. Other scholars – including Teo You Yenn, Helga Nowotny, Devesh Kapur, Arne Westad, Parvati Raghuram, Peggy Levitt and Yasmin Ortega – offered advice and suggestions for additional readings and new frameworks to use, and I am grateful to all of them for their support.

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Scientists on the Move. Joe – you have been a stalwart presence from beginning to end, always patient with me no matter how many deadlines I missed. Thank you. I must also thank the rest of the team at Cambridge – Chloe Quinn, Felinda Sharmal and Alexander Macleod – for their joint efforts to ready my manuscript for publication.

Finally, I must thank my family. Many times, my husband and children travelled with me when I flew to different countries to conduct interviews. Their memories of visiting farms and museums around the world are interwoven with my memories of interviews in grey offices and cluttered labs. I will be forever grateful for Sebastian and Paloma’s understanding when I would tell them that I have to write instead of play with them. My biggest supporter is, of course, my husband Eduardo, who took care of the kids when I could not, and who brainstormed ideas with me for each chapter. I end by thanking my parents to whom this book is dedicated. Their lived example of public service and their decision to return to India has shaped me in ways that I only fully realized as I worked on this book. Thank you for all that you have done and still do for me.

Glossary

- Academia Sinica** The National Academy of Taiwan, headquartered in Taipei
- Gaokao** (Chinese term) National College Entrance Examination in China
- Haigui** (Chinese term) A colloquial term used in China to describe Chinese emigrants who study overseas for several years and then return to China. Similar in pronunciation to the Chinese word for “sea turtle,” which travels for long distances but always returns home
- Hundred Talents Program** A program established by the Chinese Academy of Sciences (CAS) to recruit established, as well as young, overseas Chinese academics to return to work at one of the CAS institutes in China
- Impact-Factor** (Also known as journal impact factor) Calculated from the yearly average number of citations garnered by articles published by the journal in the previous two years, it is often used as a measure of a journal’s importance within a particular field
- Ivy League** A group of eight, elite and exclusive, private research universities in the northeastern USA. They include Harvard University, Princeton University, Yale University, Columbia University, Cornell University and others
- Nature** A British peer-reviewed academic journal that is considered one of the top scientific journals in the world
- One China Policy** The Chinese policy that there is only one China as opposed to two – the People’s Republic of China and the Republic of China (Taiwan)
- Project 211** A Chinese program launched in 1995 to improve the quality of education and research at approximately 100 universities throughout the country
- Project 985** A Chinese program launched in 1998 to transform some of China’s top universities into “world-class” research universities

Science A peer-reviewed academic journal of the American Association for the Advancement of Science, it is considered one of the top scientific journals in the world

Thousand Talents Program Also known as the Thousand Talents Plan, this program was established by the Chinese government in 2008 to attract overseas researchers to work in China on either permanent or short-term appointment contracts

Abbreviations

A*STAR	Agency for Science, Technology and Research (Singapore)
ASEAN	Association of Southeast Asian Nations
ATREE	Ashoka Trust for Research on Ecology and the Environment (India)
BBS	Bulletin Board System
BCE	Before the Common Era
CAS	Chinese Academy of Sciences (China)
CCMB	Centre for Cellular and Molecular Biology (India)
CCP	Communist Party of China
CMC	Christian Medical College (India)
CSIR	Council of Scientific and Industrial Research (CSIR)
CUSBEA	Chinese-US Biochemistry Examination and Application
DBT	Department of Biotechnology (India)
EU	European Union
FDI	Foreign Direct Investment
GAI	Global Asia Institute (Singapore)
GDP	Gross Domestic Product
GPA	Grade Point Average
GSK	GlaxoSmithKline
IBS	IndiaBioscience
IISc	Indian Institute of Science
IISER	Indian Institute of Science Education and Research
IIT	Indian Institute of Technology
IMCB	Institute of Molecular and Cellular Biology (Singapore)
INR	Indian Rupees
IP	Intellectual Property
KMT	Kuomintang Party
MBBS	Bachelor of Medicine, Bachelor of Science (undergraduate medical degree common in the UK and Commonwealth countries)

MD	Doctor of Medicine (graduate medical degree common in the USA)
MD+PHD	Doctor of Medicine and Doctor of Philosophy
MIT	Massachusetts Institute of Technology (USA)
MOST	Ministry of Science & Technology (Taiwan)
NBRP	National Biotechnology Research Park (Taiwan)
NCBS	National Centre for Biological Sciences (India)
NHRI	National Health Research Institutes (Taiwan)
NIH	National Institutes of Health (USA)
NSF	National Science Foundation (USA)
NSTB	National Science and Technology Board (NSTB) (Singapore)
NT\$/NTD	New Taiwan Dollars
NTU	Nanyang Technological University (Singapore)
NUS	National University of Singapore (Singapore)
OECD	Organization for Economic Co-operation and Development
OPT	Optional Practical Training (USA)
PhD	Doctor of Philosophy
PI	Principal Investigator
PRC	People's Republic of China
R&D	Research and Development
RMB	Renminbi (the official currency of China)
ROC	Republic of China (the official name of Taiwan)
SBS	School of Biological Sciences (Singapore)
SGD	Singapore Dollars
STEM	Science, Technology, Engineering and Mathematics
STS	Science and Technology Studies
THE	Times Higher Education
TIFR	Tata Institute of Fundamental Research (India)
TIGP	Taiwan International Graduate Program
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
US/USA	United States of America
USD/US\$	US Dollars

Note: when it is not clear where a particular abbreviation originates, the relevant country is included in parenthesis.