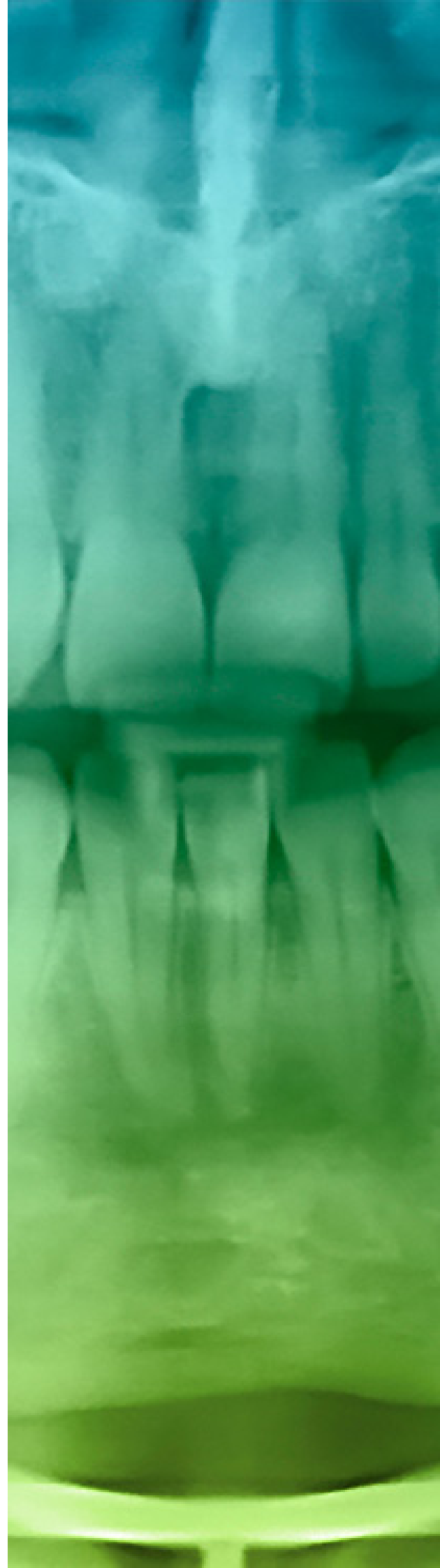




THE UNIVERSITY OF
SYDNEY

Bela Schwartz Post- Doctoral Fellowship

2020 Report



Bela Schwartz Post-Doctoral Fellowship

“The research and programs you fund improve healthcare, help disadvantaged people access education, and safeguard the future of the planet.”

- Dr Michael Spence AC
Vice-Chancellor and Principal
The University of Sydney



Dentistry student at Westmead Centre for Oral Health.

On behalf of the University of Sydney, thank you for creating the *Bela Schwartz Post-Doctoral Fellowship* within the School of Dentistry.

This prestigious fellowship has supported Dr Shanika Nanayakkara and her work in leading the establishment of a multidisciplinary oral health database and bio-specimen bank at the Westmead Centre for Oral Health.

A window into overall health

Oral health is closely linked to the state of our overall health and wellbeing, and impacts the lives of many people around the world.

A major barrier for clinical and public health research in oral health is the inability to acquire samples of adequate size and quality because of factors including the cost and time associated with recruiting participants.

Thanks to the generosity of Dr Jerry Schwartz, this project was started to address this gap. The project was established to develop a multidisciplinary oral health database and biobank. It aimed to establish a repository of comprehensive clinical data and biological samples from a significant number of patients and make this readily available for clinicians.

The overall objective was to help identify the risk factors for oral health diseases and their association and interaction with systemic diseases to ultimately improve community health.

We are pleased to present this report to you as an overview of the project, and a final update since it began in 2012.

Multidisciplinary oral health database

Westmead oral health database was created to systematically collect information on the types of patients seen and the treatment provided at Westmead. Its task was to compile the demographic, lifestyle-related and clinical information of consenting patients who were being treated at clinics at the Westmead Centre for Oral Health.

An electronic application which used FileMaker software is used to collect and store data in a University of Sydney server. Collected data is available for Human Research Ethics Committee approved research projects which investigate oral health related issues.



The biobank at the Westmead Centre for Oral Health.

Below, key achievements and progress of this database are outlined.

2013-2015

- Development of a multidisciplinary survey form
- Ethical approval of a large questionnaire
- Pilot testing of the survey form
- Pilot testing of the survey form – student use
- Database storage-pilot phase (local storage)
- Database secure storage – University secure network
- Developing electronic application – data collection
- Pilot testing of the electronic application

2016

- Preparation of data access policies
- Modifications in the electronic application based on pilot testing

2017-2019

- Development of a sample inventory database
- Using the electronic application for data collection
- Developing a retrospective clinical cohort database of the children receiving dental treatment under general admission at the Westmead Centre for Oral Health
- A research project commenced and is currently under review for publication in the Journal of Oral Science: Pediatric dental treatment under general anesthesia in a tertiary public facility in Australia: A retrospective study.

The establishment of the biobank

The multidisciplinary oral health database is linked to a biobank called the Westmead Oral Health Biobank, which stores samples of patient saliva, extracted teeth, blood, urine, dental plaque and tissue. This collection is then available for clinicians to conduct research on dental diseases and their treatments. While there are several biobanks within the Westmead precinct, Westmead Oral Health Biobank is unique, being the only biobank collecting and storing oral samples for future research.

Below, key achievements of the biobank are outlined.

2015

- Ethics approval - sample collection at Westmead Centre for Oral Health
- Protocol preparation – sample collection
- Preparation of the sample inventory
- Preparation of the sample access policies

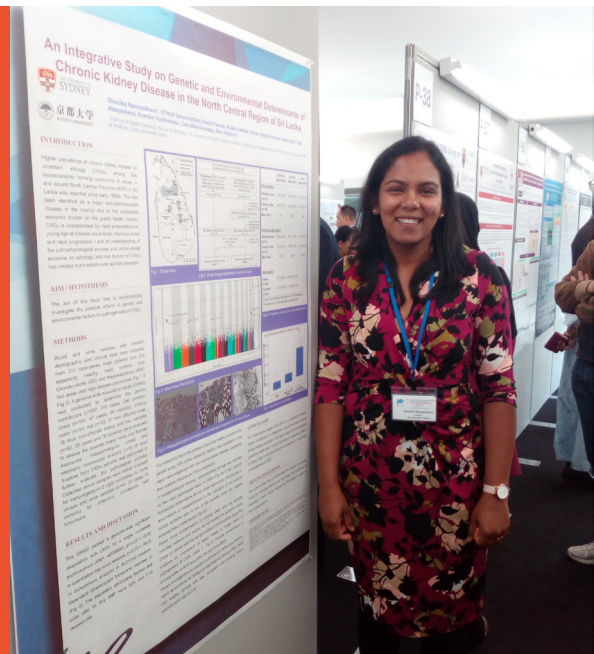
2016:

- Preparation of standard operating procedures for sample collection, preservation and storage
- Establishing sample storage facilities, equipment and consumables for the biobank
- Assessment of the sample preservation and storage facilities

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“While there are several biobanks within the Westmead precinct, Westmead Oral Health Biobank is unique, being the only biobank collecting and storing oral samples for future research.”

- Dr Shanika Nanayakkara



Dr Shanika Nanayakkara at the Koyoto Global Conference for Rising Public Health Researcher, 2017.

2017

- Sample collection and storage protocol evaluation
- A new international collaboration started with Professor James Deschner - the first project to utilise biobank samples

2018

- Successfully developed into a multi-centre project which expanded into Nepean Hospital and Sydney Dental Hospital
- Two researchers donated samples to the biobank
- Optimal sample preservation and storage conditions for oral samples have been identified

2019

- An oral health therapist was involved in the sampling process at Westmead Hospital. This was to evaluate the feasibility of recruiting patients from all the dental disciplines at Westmead for Oral Health
- Arranged a temporary sample storage facility at Nepean Hospital

As of 2019, we have established the facilities and the sampling processes of the biobank that will continue to grow into a valuable resource for research activities over the coming years.

Interdisciplinary research

The combination of the multidisciplinary oral health database, along with the biobank, has facilitated new research projects involving interdisciplinary and international partnerships.

Below, several of the ongoing research initiatives supported by the biobank are outlined.

- *Role of Apelin in Chronic Periodontitis* – an international collaboration with Professor James Deschner from the University Medical Centre of the Johannes Gutenberg University.
 - A summer student was also involved in this project under the supervision of Dr Xiaoyan Zhou from December 2018 to January 2019
- *Atomic force microscopy adhesion-force mapping of caries and non-caries human enamel and dentine*
- *The response of oral and maxillofacial tissues to mechanical stress*

The diversity of projects outlined above demonstrate the positive impact both resources are having for our researchers not only here at the University of Sydney, but also abroad.

Aside from these biobank supported projects, Dr Nanayakkara has also co-authored many other research publications. For a full list of these publications, please see appendix one.

Supporting the next generation of dentists and researchers

In 2013, Dr Nanayakkara began her academic career as a fellow and recipient of the Bela Schwartz Post-Doctoral Fellowship and in 2016 was promoted to Associate Lecturer and two years later to Lecturer in the University of Sydney School of Dentistry.

As a Lecturer, she coordinates the subjects 'Research Unit of Study,' 'Research Methods' and 'Evidence-Based Practice', which is for Doctor of Dental Medicine and clinical postgraduate students. Through this, Dr Nanayakkara is educating the next generation of researchers, while encouraging the clinical trainees to incorporate research evidence in clinical decision making.

Dr Nanayakkara has implemented substantial changes to the curriculum. For example, she re-designed the curriculum using a spiral approach with hands-on interactive sessions to introduce new concepts early in the program. She also revisited these concepts in increasingly more complex ways as the students proceeded through the program. These changes have been well received by both peer academics and the students, leading to a significant improvement in students' satisfaction in their learning experience.

She has received recognition of her valuable contribution to education through the following acknowledgements:

- Winner of the prestigious Professor Roland Bryant Award for Excellence and Initiative in Teaching in 2018
- Fellow of the Higher Education Academy of UK through the Sydney Educational Fellowship Program in 2019

Additional members of the team

Dr Xiaoyan Zhou completed her bachelor's degree with honours at Guanghua School of Stomatology, Sun Yat-sen University in 2007 and a Master of Clinical Dentistry (Endodontics) at the same university.

After completing her PhD at the University of Sydney in 2015, she was appointed as a post-doctoral researcher at Sydney Dental School. She joined the team in establishing the oral health biobank linked to a multidisciplinary patient oral health database. She actively participated in protocol developments and sample quality assessment.



Dr Shanika Nanayakkara receiving the award for best young investigator poster.

Other highlights

During her fellowship, Dr Nanayakkara was able to attend several conferences to present her research.

2017

Kyoto Global Conference for Rising Public Health Researchers, Kyoto 2017

- 'Genetic and environmental determinants of chronic kidney disease of unknown etiology'
- Dr Nanayakkara won the award for best young investigator poster

2019

Challenges in Environmental Science and Engineering, Taiwan 2019

- 'Effect of fluoride in the progression of chronic kidney disease of uncertain etiology in Sri Lanka'
 - Dr Nanayakkara received a poster award for the theme 'Contribution to Health'
- 'Possibility to integrate biological and environmental quality parameters for early detection of chronic kidney disease of uncertain etiology in Sri Lanka'

International Association for Dental Research Asia Pacific Region, Brisbane 2019

- 'Evaluating the effect of storage media and DNA extraction method on the recovery of bacteria from the oral microbiome'
 - Dr Zhou presented and attended this conference

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Dr Shanika Nanayakkara and Dr Xiaoyan Zhou at the Westmead Centre for Oral Health.

Words of gratitude

Dr Shanika Nanayakkara

Lecturer, Sydney Dental School and Bela-Schwartz Post-Doctoral Fellow

“It has been a privilege to be the recipient of *the Bela-Schwartz Post-Doctoral Fellowship*. It gave me a great starting block to build my academic career at the University of Sydney. Without a doubt, this fellowship paved the way for all my career achievements and success. I am grateful to Dr Schwartz and the Schwartz Foundation for their generosity and support of young academics like me.”

Professor Heiko Spallek

Head of School and Dean of Dentistry

“Thanks to the generosity of your gift, we have been able to develop this database successfully, which facilitates the collection of clinical data to develop a resource for current researchers. More importantly, as it continues to grow, it will be vital

for future researchers investigating various aspects of oral health.”

Thank you

Dr Schwartz, you have our deepest gratitude for your support of this project. Your generosity towards *the Bela Schwartz Post-Doctoral Fellowship* has allowed us to establish a multidisciplinary oral health database and biobank at the Westmead Centre for Oral Health and support young academics like Dr Shanika Nanayakkara.

This project has facilitated several oral health research projects, including one international collaboration. Because of your foresight, clinicians and researchers now have the resources available to them to conduct research and ultimately find ways to improve our community’s health.

Appendix one

- Kabata, R., Nanayakkara, S., STMLD, S., Harada, K.H., Chandrajith, R., Hitomi, T., Abeysekera, T., Takasuga, T. and Koizumi, A., 2015. Neonicotinoid concentrations in urine from chronic kidney disease patients in the North Central Region of Sri Lanka. *Journal of occupational health*, pp.15-0140.
- Nanayakkara, S., Zhou, X. and Spallek, H., 2019. Impact of big data on oral health outcomes. *Oral diseases*, 25(5), pp.1245-1252.
- Nanayakkara, S. and Zhou, X., 2019. Periodontitis May Be Associated With Chronic Kidney Disease, but Evidence on Causal Association Is Limited. *Journal of Evidence Based Dental Practice*, 19(2), pp.192-194.
- Nanayakkara, S., Senevirathna, S.T.M.L.D., Harada, K.H., Chandrajith, R., Hitomi, T., Abeysekera, T., Muso, E., Watanabe, T. and Koizumi, A., 2019. Systematic evaluation of exposure to trace elements and minerals in patients with chronic kidney disease of uncertain etiology (CKDu) in Sri Lanka. *Journal of Trace Elements in Medicine and Biology*, 54, pp.206-213.
- Nanayakkara, S., Senevirathna, S.T.M.L.D., Parahitiyawa, N.B., Abeysekera, T., Chandrajith, R., Ratnatunga, N., Hitomi, T., Kobayashi, H., Harada, K.H. and Koizumi, A., 2015. Whole-exome sequencing reveals genetic variants associated with chronic kidney disease characterized by tubulointerstitial damages in North Central Region, Sri Lanka. *Environmental health and preventive medicine*, 20(5), p.354.
- Nanayakkara, S., Stmld, S., Abeysekera, T., Chandrajith, R., Ratnatunga, N., Edl, G., Yan, J., Hitomi, T., Muso, E., Komiya, T. and Harada, K.H., 2013. An integrative study of the genetic, social and environmental determinants of chronic kidney disease characterized by tubulointerstitial damages in the North Central Region of Sri Lanka. *Journal of occupational health*, pp.13-0172.
- Nokhbehshaim, M., Memmert, S., Damanaki, A., Nanayakkara, S., Zhou, X., Jäger, A. and Deschner, J., 2019. Effect of interleukin-1 on ghrelin receptor in periodontal cells. *Clinical oral investigations*, 23(1), pp.113-122.
- Nokhbehshaim, M., Damanaki, A., Nogueira, A.V.B., Eick, S., Memmert, S., Zhou, X., Nanayakkara, S., Götz, W., Cirelli, J.A., Jäger, A. and Deschner, J., 2017. Regulation of ghrelin receptor by periodontal bacteria in vitro and in vivo. *Mediators of inflammation*, 2017.
- Spallek, H., Weinberg, S.M., Manz, M., Nanayakkara, S., Zhou, X. and Johnson, L., 2019. Perceptions and Attitudes toward Data Sharing among Dental Researchers. *JDR Clinical & Translational Research*, 4(1), pp.68-75.
- Wong, G., Apthorpe, H.C., Ruiz, K. and Nanayakkara, S., 2019. A Tale of Two Teaching Methods: Students' Clinical Perspectives on Administering Dental Local Anesthetics. *Journal of dental education*, pp.JDE-019.
- Wong, G., Apthorpe, H.C., Ruiz, K. and Nanayakkara, S., 2019. An innovative educational approach in using instructional videos to teach dental local anaesthetic skills. *European Journal of Dental Education*, 23(1), pp.28-34.
- Wong, G., Apthorpe, H.C., Ruiz, K. and Nanayakkara, S., 2019. Student-to-Student Dental Local Anesthetic Preclinical Training: Impact on Students' Confidence and Anxiety in Clinical Practice. *Journal of dental education*, 83(1), pp.56-63.
- Zhou, X., Nanayakkara, S., Gao, J.L., Nguyen, K.A. and Adler, C.J., 2019. Storage media and not extraction method has the biggest impact on recovery of bacteria from the oral microbiome. *Scientific reports*, 9(1), pp.1-10.

For more information

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