Kumaran Narayanan, Ph.D.

Internal Auditor for MyRA, Ministry of Higher Education, Malaysia
Chair, Course Advisory Board, Jeffrey Cheah School of Medicine and Health Sciences
Cluster Leader, Global Asia in the 21st Century Research Platform
Associate Professor, School of Science

MONASH UNIVERSITY MALAYSIA,

FORMAL LEADERSHIP AND GOVERNANCE ROLES:

- **Internal Auditor for Malaysia Research Assessment (MyRA), Ministry of Higher Education Malaysia** *(2021-present)*
- **Chair, Course Advisory Board, Jeffrey Cheah School of Medicine and Health Sciences** *(2019-present)*
- **Cluster Leader, Global Asia in the 21st Century (GA21) Research Platform** *(Jan 2018-present)*
- **Deputy Chair, Campus Research** *(Jan 2019-Dec 2020)*
- **Deputy Head of School**, School of Science *(Jan 2015- 30 Apr 2019)*
- **Head, Discipline of Biological Sciences**, School of Science *(July 2012-Dec 2014)*
- **Inaugural Coordinator, BSc Course**, School of Science *(Jan 2011-June 2012)*

QUALITY ASSURANCE AND ACCREDITATION LEADERSHIP ROLES:

- BSc and BSc (Hons.) Course Advisory Panel Member and Coordinator
- Research Masters and Doctoral Degrees Program Accreditation and Review Panel
- BFoodSciTech Course Advisory Panel
- Self-Accreditation Maintenance Audit

OTHER ROLES:

- Founding Member, Industry Advisory Board, School of Science *(2015- present)*
- Malaysian Biotechnology Information Centre (MABIC), Distinguished Fellow, Scientific Advisory Board *(2016-present)*
- Mentor, Monash Global Staff Mentoring Program (*2021- present*)
- Mentor, Campus Mentoring Scheme for Early Career Academic Staff *(2016- present)*
- Research Masters and Doctoral Degrees Program Accreditation and Review Panel *(2017)*
- University's Discipline Panel, Monash University Malaysia *(2016-2018)*
- Campus Research Committees *(2015-2018)*
- Campus Intellectual Property Committee *(2016-present)*
- Campus Industry Engagement Reference Group *(2015-present)*
- School Management Committee *(2012-2019)*
- School Education Committee (2011-2014)
- Chair or member of many other committees and taskforces (*2009-present*): e.g., Campus Masterplan, Senior Management Group, Campus Compliance.

ACADEMIC APPOINTMENTS:

- **Associate Professor**, School of Science, Monash University Malaysia *(Jan 2016-present)*
- **Senior Lecturer**, School of Science, Monash University Malaysia *(May 2009-Dec 2015)*
- **Adjunct Assistant Professor**, Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, Mount Sinai Medical Center, New York (May 2009 – Dec 2018)
- **Assistant Professor**, Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, New York *(Dec 2005-Apr 2009)*
- **Assistant Professor**, Biotechnology Program, Malaysia University of Science and Technology, Petaling Jaya *(Mar 2002-Nov 2005)*
- **Lecturer**, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Sarawak *(Jul 1999-Feb 2002)*
- **Tutor**, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Malaysia *(Jun 1996-Jun 1999)*
- **Tutor**, Faculty of Science, Universiti Malaya *(Mar 1996-May 1996)*

EDUCATION AND TRAINING:

- Ph.D., 1999, Dept of Paediatrics, Royal Childrens Hospital, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Australia

- B.Sc. (Hons.), 1995, Genetics (Microbiology minor): Department of Genetics and Cell Biology, University of Malaya, Malaysia

POSTDOCTORAL TRAINING:

- 2000-2005, Visiting Scientist, Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, Mount Sinai Medical Center, New York

RESEARCH GRANTS:

Active:

- **Ministry of Education (MoE) Fundamental Research Grant Scheme (FRGS)**
  Sept 2019-Aug 2022
  "Fabry disease: Understanding the requirements for genetic complementation of the defect by modifying alpha-galactosidase A and globotriaosylceramide levels"
  Kumaran Narayanan (Project Leader)., J.C., Juan (UM), R. Naidu (Monash)

- **Ni Hsin Food & Beverages Sdn Bhd (Industry Fund)**
  1 Mar 2021- 28 Feb 2023
  "Bio-Energy Coffee Project"
  Kumaran Narayanan (Principal Investigator); Joash Tan Ban Lee, Alpha Agape Gopalai, Vineetha Kalavally, Adrian Willoughby (all from Monash) and Thoh Ging Seng (Ni Hsin).

- **Ministry of Education (MoE) Fundamental Research Grant Scheme (FRGS)**
  1 May 2021- 30 Apr 2023
  "Genomics and transcriptomics study on heat stress response of weedy rice (Oryza sativa L.)"
  Song, B.K., Rahman, S., **Kumaran Narayanan** (Researcher), Masilamany, D.

- **Ministry of Education (MoE) Prototype Research Grant Scheme (PRGS)**
  Janarthanan, P., Pasbaksh, P., **Kumaran Narayanan (Researcher)**, Paramasivam, R., Raj, D., Langford, S. 1 Aug 2019- 31 Jul 2021
  "Farmer-friendly and cost-effective handheld vaccine and growth supplements beads delivery system for poultry industry"

Completed:

- **Ministry of Higher Education (MoHE) Fundamental Research Grant Scheme (FRGS)**
  Aug 2016 to Jan 2020
  *"*Understanding the Expression Characteristics and Activities of the Phage N15 Protelomerase in Mammalian Cells"
  Kumaran Narayanan (Project Leader)., E.U.I., Sim (UNIMAS), Song, B.K. (Monash)

- **Relivium Sciences Sdn Bhd (Industry grant)**
  Apr 2017 – Mar 2019
  "Product Testing for Relivium Sciences"
  Kumaran Narayanan (Project Leader)., Sunil K. Lal (Monash), and Emily Goh Joo Kheng (Monash)

- **Fiatec Biactive Sdn Bhd (Industry Grant)**
  16 Jan 2017 – 15 Jan 2019
  "The glycemic index (GI) of SUITENA 178, a naturally-occuring polyol"
  Kumaran Narayanan (Project Leader)., Ngin Cin Khai (Monash), and Priyia Pusparajah (Monash)

- **Ministry of Higher Education (MoHE) Fundamental Research Grant Scheme (FRGS)**
  2 Nov 2015 to 1 Nov 2018
  "Attenuating Influenza A Virus Endocytosis By HB-EGF (Heparin-Binding EGF-Like Growth Factor)"
  Khai, N.C (Project Leader)., Lee, W.L., Aditya, A., **Kumaran Narayanan**. (Researcher), Sidek, H.M

- **Ministry of Science, Technology and Innovation (MOSTI) Malaysia E-Science Fund**
  1 Jan 2015 – 30 Sept 2017
  "Advancing E.coli as a Vector for Gene Delivery into Human Cells: Hybrids with DNA/protein delivery reagents and intracellular strategies"
  Kumaran Narayanan (Project Leader) and Lee, C.W. (UM)

- **Ministry of Higher Education (MoHE) Experimental Research Grant Scheme (ERGS)**
  15 July 2012 – 14 July 2015
  "Functional expression of bacteriophage N15 protelomerase activity in mammalian cells"
  Kumaran Narayanan (Project Leader) and Lee, C.W. (UM)

- **Ministry of Higher Education (MoHE) Research Acculturation Collaborative Effort (RACE) grant Scheme**
  Jan 2013 to Dec 2015
  "*Identification and characterisation of the molecular pathways mediated by a subset of human ribosomal protein genes****"***
  Edmund Sim U.H. (UNIMAS) and **Kumaran Narayanan** (Researcher)

- **Ministry of Higher Education (MoHE) Fundamental Research Grant Scheme (FRGS)**
  7 July 2011 to 31 Dec 2013
  "*Determining the minimal length of sequence homology between donor and recipient DNA for homologous recombination to occur in E. coli*"
  Kumaran Narayanan: Project Leader

- **Monash University Bioactive Compounds Research Strength**
  Oct 2010- 30 Sept 2011
  "Gene delivery into cancer cells using an E. coli vector"
  Kumaran Narayanan: Project Leader

- **Monash University Seed Grant Funding**
  18 July 2009 – 17 July 2010
  "*Investigation of phage N15 protelomerase enzyme activity after transfer into mammalian cells"*
  Kumaran Narayanan: Project Leader

- **National Institute of Diabetes and Digestive and Kidney Diseases (NIDDKD)**
  National Institutes of Health (NIH), USA
  1 Feb 2005-31 Jan 2010
  "*E. coli-based vectors for BAC delivery to mammalian cells*"
  Kumaran Narayanan: Co-Investigator, at the Icahn School of Medicine at Mount Sinai, New York

- **Ministry of Science, Technology and Innovation (MOSTI), Malaysia**
  1 Aug 2004 - 31 July 2007 "*E. coli vector system for modification and delivery of genomic transgenes into human cells.*"
  Kumaran Narayanan: Project Leader

- **National Institute of Diabetes and Digestive and Kidney Diseases (NIDDKD)**
  National Institutes of Health (NIH), USA
  1 Feb 2001-31 Jan 2003
  "*E. coli based vectors for gene delivery to human cells*"
  Kumaran Narayanan: Fellow, at the Icahn School of Medicine at Mount Sinai, New York

SELECTED PUBLICATIONS:

- Ng, A.W.R. and **Narayanan, K**. (2021). An antibody binding-based fluorescent assay for the rapid quantification of globotriaosylceramide levels in Fabry cells. *Analytical Biochemistry*: doi: 10.1016/j.ab.2021.114287.

- Sim, E.U.H., Lee, C.W., **Narayanan, K.** (2021). The roles of ribosomal proteins in nasopharyngeal cancer: culprits, sentinels or both. *Biomarker Res.* doi:10.1186/s40364-021-00311-x.

- Akinsola, R.O., Lee, C.W., Sim, E.U.H., **Narayanan, K.** (2021). Inhibition of lysosomal vacuolar proton pump down-regulates cellular acidification and enhances E. coli bactofection efficiency. *Analytical Biochemistry*: doi: 10.1016/j.ab.2020.114088.

- Lee, C.W., Lim, J.H., Heng, P.L., Marican, N.F., **Narayanan, K.**, Sim, E.U.H., and Bong, C.W. (2020). Influence of elevated river flow on hypoxia occurrence, nutrient concentration and microbial dynamics in a tropical estuary. Environ Monit Assess. doi: 10.1007/s10661-020-08625-3.

- Liew, P.S., Tan, T.H., Wong, Y.C., Sim, E.U.H., Lee, C.W., **Narayanan, K**. (2020). A self-replicating linear DNA. ACS Synthetic Biology: doi: 10.1021/acssynbio.9b00478

- Liew, P.S., Chen, Q., Ng, A.W.R., Chew, Y.C., Ravin, N.V., Sim, E.U., Lee, C.W., **Narayanan, K.** (2019). Phage N15 protelomerase resolves its tos recognition site into hairpin telomeres within mammalian cells. *Analytical Biochemistry*: doi.org/10.1016/j.ab.2019.113361.

- Wong, P.S., Lee, C.W., Bong, C.W., Lim, J.H., **Narayanan, K.**, Sim, E.U. (2019). Environmental control of *Vibrio* spp. abundance and community structure in tropical waters. FEMS Microbiology Ecology: https://doi.org/10.1093/femsec/fiz176.

- Ng, A.W.R., Loh, K.K., Gupta, N., **Narayanan, K**. (2019). A Polyol-Stevia Blended Sugar Replacer Exhibits Low Glycemic Response among Human Subjects. *Clinical Nutrition ESPEN:* https://doi.org/10.1016/j.clnesp.2019.07.014

- Osahor, A., Deekonda, K., Lee, C.W., Sim, E.U., Radu, A., and **Narayanan, K.** (2017). Rapid preparation of adherent mammalian cells for basic scanning electron microscopy (SEM) analysis. *Analytical* Biochemistry 534: 46-48

- Sim, E.U., Ng, K.L., Lee, C.W., and **Narayanan, K.** (2017). The uS8, uS4, eS31, and uL14 ribosomal protein genes are dysregulated in nasopharyngeal carcinoma cell lines. (2017). BioMed Research International 4876954, doi.org/10.1155/2017/4876954

- Sim, E.U., Chan, S.L., Ng, K.L., Lee, C.W., and **Narayanan, K.** (2016). Human Ribosomal Proteins RPeL27, RPeL43 and RPeL41 are Up-regulated in Nasopharyngeal Carcinoma Cell Lines. (2016). Disease Markers. 2016:5179594. doi: 10.1155/2016/5179594.

- Sim, E.U., Ma, X, Chan, S.L., Lee, C.W, **Narayanan, K**. (2016) Predicted interaction of human Ribosomal Protein S15 with Fragile X Mental Retardation Protein. *J. App. Biol. & Biotechnology* 4: 38-45.

- Hui, Y.W., **Narayanan, K.,** and Dykes, G.A. (2015). Control of Attachment of Pseudomonas aeruginosa and Burkholderia cepacia to Surfaces by Shear Force. *Water Environ. Res*. 88: 2040-2046, doi:10.2175/106143016X14504669767292

- Lee, S.W., Lee, C.W., Bong, C.W., **Narayanan, K**., and Sim, U.E. (2015). The dynamics of attached and free-living bacterial population in tropical coastal waters. *Marine and Freshwater Research* 66: 701-710.

- Chen, Q. and **Narayanan, K. (**2015). Recombineering linear BACs. In Bacterial Artificial Chromosomes, 2nd Edition: Methods in Molecular Biology Series**,** Kumaran Narayanan (Editor), Springer, New York.

- Osahor, A.N., Tan, C.Y., Sim, E.U., Lee, C.W., and **Narayanan, K**. (2014)**.** Short homologies efficiently generate detectable homologous recombination events. *Analytical Biochemistry* 462: 26-8. doi: 10.1016/j.ab.2014.05.030.

- Chen, Q., Lee, C.W., Sim, E.U, and **Narayanan, K.** (2014) Induction of protein expression within *E. coli* bactofection vector for entry into mammalian cells. *Human Gene Therapy Methods* 25: 40-7.

- **Narayanan, K.,** Sim, E.U, Lee, C.W., Radu, A. (2013). *E. coli* bactofection using Lipofectamine**.** *Analytical Biochemistry* 439:142-4.

- Chen, Q. and **Narayanan, K.** (2011). Crude protein extraction protocol for phage N15 protelomerase *in vitro* enzymatic assays. *Analytical Biochemistry* 414: 169-171.

- **Narayanan, K.**, and Chen, Q. (2011). Bacterial artificial chromosome mutagenesis using recombineering. *J. Biomedicine and Biotechnology* 971296, doi:10.1155/2011/971296.

- Lee, C.W., Ng, A.Y., Bong, C.W., **Narayanan, K.**, Sim, E.U., Ng, C.C. (2011). Investigating the decay rates of *Escherichia coli* relative to *Vibrio parahemolyticus* and *Salmonella Typhi* in tropical coastal waters. *Water Research* 45:1561-70.

- Sim, E.U, Ang, C.H., Ng, C.C., Lee, C.W., and **Narayanan, K.** (2010). Differential expression of a subset of ribosomal protein genes in cell lines derived from human nasopharyngeal epithelium. *J. Human Genetics* 55:118-20.

- Lee, C.W., Ng, A.Y., **Narayanan, K**., Sim, E.U., Ng, C.C. (2009). Isolation and characterization of culturable bacteria from tropical coastal waters. *Ciencias Marinas* 35: 153–167

- **Narayanan, K**., Sim, E.U, Ravin, N.V., and Lee, C.W. (2009). Recombination between double-stranded DNA substrates *in vivo*. *Analytical Biochemistry* 387: 139-141.

- **Narayanan, K.** (2008). Intact recombineering of highly repetitive DNA requires reduced induction of recombination enzymes and improved host viability. *Analytical Biochemistry* 375: 394-396.

- Ooi, Y.S., Warburton, P.E., Ravin, N.V., and **Narayanan, K.** (2008). Recombineering linear DNA that replicate stably in *E. coli*. *Plasmid* 59: 63-71.

- **Narayanan, K.**, and Warburton, P.E. (2003). DNA modification and functional delivery into human cells using *E. coli* DH10B. *Nucleic Acids Research* 31:e51.

- Jamsai, D., Nefedov, M., **Narayanan, K.**, Orford, M., Fucharoen, S., Williamson, R., and Ioannou, P.A. (2003). Insertion of common mutations into the β-globin locus using *GET Recombination* and an *Eco*RI endonuclease counter-selection cassette. *Journal of Biotechnology* 101:1-9.

- **Narayanan, K.**, Williamson, R., Zhang, Y., Stewart, A. F., and Ioannou, P.A. (1999). Efficient and precise engineering of a 200 kb β-globin human/bacterial artificial chromosome in *E. coli* DH10B using an inducible homologous recombination system. *Gene Therapy* 6: 442-447.

Books:

- Bio-Carrier Vectors (2021), Methods in Molecular Biology Series
  Kumaran Narayanan (Editor), Springer Nature, New York

- Bacterial Artificial Chromosomes (2015), 2nd Edition: Methods in Molecular Biology Series
  Kumaran Narayanan (Editor), Springer Nature, New York

SELECTED CONFERENCE PRESENTATIONS:

- **Narayanan, K.** (2018). Strengthening the development and implementation of Biotechnology and Biosafety Policy and Regulation in SEA. UN Biodiversity Conference 2018 in Sharm El-Sheikh, Egypt, 17-29 Nov 2018, Sharm El-Sheikh, Egypt **(Invited)**.
- **Narayanan, K.** (2018). Gene Delivery into Mammalian Cells using Bacteria as a Vector. UTAR Intervarsity Scientific Symposium 2016, 3-4 Aug 2018, University Tunku Abdul Rahman, Perak. **(Invited Plenary Speaker).**
- Osahor, A. and **Narayanan, K.** (2017). Strategies to improve *E.coli*-mediated functional gene delivery to mammalian cells. 15th International Student Seminar on Biostudies, Frontier life and Medical Sciences, 24-24 Feb 2017, Kyoto, Japan.
- **Narayanan, K.** (2016). Intracellular Strategies for Gene Delivery into Mammalian Cells using Bacteria as a Vector. ICBBS 2016: 18th International Conference on Biotechnology and Biological Sciences", Zurich, Switzerland, 21-22 Jul 2016.
- **Narayanan, K.** (2016). Linear Chromosomes Derived from Phage N15: Towards Assembly of Artificial Chromosomes. UTAR Intervarsity Scientific Symposium 2016, 12-13 Aug 2016, University Tunku Abdul Rahman, Perak. **(Invited Plenary Speaker).**
- **Narayanan, K. (**2015). Functional Expression of the Phage N15 Protelomerase in Human Cells: Towards Assembly of Artificial Chromosomes. International Conference on Nanotechnology, Biology & Medical Sciences", Istanbul, Turkey, 30 Nov-1 Dec 2015. **(Keynote)**
- **Narayanan, K.** (2015). "Publishing in impact factor journals for biological science and biochemistry disciplines" Workshop, Universiti Malaysia Sarawak, 7 May 2015 **(Invited).**
- Hui, Y.W., **Narayanan, K**., Dykes, G.A. (2012). Modulation of bacterial attachment on various surfaces through cell surface modification. Biofilm5, Paris,10-12 December 2012.
- **Narayanan, K**., Sim, E.U, and Lee, C.W. (2012). Optimal bactofection into HT1080 cells is achieved at low multiplicity of infections. International Conference on Biological and Ecological Systems, Penang, 27-28 November 2012.
- Chen, Q., Chow, S.C., and **Narayanan, K.** (2012). Controlled induction of protein expression improves internalization of *Escherichia coli* into mammalian cells during bactofection. 112 th General Meeting of the American Society for Microbiology (ASM), San Francisco, 16-19 June 2012.
- **Narayanan, K.** (2011). Invasive *E. coli* Vector For Gene Delivery Into Mammalian Cells. 9th National Congress on Genetics, Kuching, Sarawak
- **Narayanan, K.** (2008). Recombineering: DNA engineering using homologous recombination in *E. coli*. Icahn School of Medicine at Mount Sinai, New York, USA.
- **Narayanan, K**. (2004). *E. coli* based vector for DNA modification and delivery to mammalian cells. National Institutes of Health (NIH)/National Cancer Institute (NCI) Human Artificial Chromosome Workshop Bethesda, MD. (*Invited*).
- **Narayanan, K**. (2003). *E. coli* system for BAC modification and delivery to mammalian cells. 5th National Congress on Genetics, Kuala Lumpur, Malaysia.
- **Narayanan, K.** (2001). *E. coli* vector for modification and delivery of large genomic transgenes: towards building human artificial chromosomes. Icahn School of Medicine at Mount Sinai, New York, USA.
- **Narayanan, K.**, Williamson, R., Zhang, Y., Stewart, A. F., and Ioannou, P.A. (1999). Rapid modification of bacterial artificial chromosomes in *E. coli*. European Journal of Human Genetics, vol. 7, no. Suppl. 1. Thirty First Annual Meeting of the European Society of Human Genetics, Geneva, Switzerland; May 29-June 1, 1999 ISSN: 1018-4813**.**
- **Narayanan, K.**, Williamson, R., and Ioannou, P.A. (1999). Efficient and precise engineering of bacterial artificial chromosomes in *E. coli*. Inaugural meeting of the Australasian Gene Therapy Society, Melbourne, Australia.
- **Narayanan, K.** (1995). *Plasmid- and transposon-mediated multiple antibiotic resistances in Salmonella typhi.* 5th Scientific Meeting of the Malaysian Society of Molecular Biology and Biotechnology, Kuala Lumpur, Malaysia.

REFEREE/REVIEWER FOR SCIENTIFIC JOURNALS:

- "Nature Communications", Nature Publishing Group
- "Nucleic Acids Research", Oxford University Press
- "Molecular Pharmaceutics", American Chem Society
- "Gene Therapy", Nature Publishing Group
- "International Journal of Nanomedicine" Dove Press
- "Toxicology and Applied Pharmacology", Elsevier
- "Journal of Biotechnology", Elsevier
- "Analytical Biochemistry", Elsevier
- "Molecular Biotechnology", Springer
- "Journal of Gene Medicine", Wiley-Blackwell

PHD STUDENTS:

- 11 PhD students graduated
- 4 PhD students ongoing

PHD/MSc EXTERNAL EXAMINER:

- Mr Scott Quainoo (8 Nov 2021, Scheduled) (PhD). Development of a novel drug delivery vector for transferring therapeutic molecules to immmune cells for *in vivo* cell engineering. **Technical University of Denmark, Denmark.**

- Ms. Astrid Glaser (2018) (PhD). Gene therapy for β-thalassaemia: Targeted modification of the human β-globin locus. **University of Melbourne, Australia.**

- Ms. Saffiya Habib (2018) (PhD). Anti-c-myc cholesterol-based lipoplexes: Development, characterisation and evaluation as onconanotherapeutic agents in vitro. **University of Kwazulu-Natal, Durban, South Africa.**

- Ms. Fiona Maiyo (2018) (PhD). Functionalised Selenium Nanoparticles: Potential in Targeted Cancer Gene Delivery. **University of Kwazulu-Natal, Durban, South Africa.**

- Mr G.K Lohith (2018) (PhD). Molecular Detection of *Vibrio vulnificus* Isolated from Marine Sources. **Bharathiar University, Coimbatore, India**

- Ms. Chan Xiao Ying (2017) (PhD). Molecular expression of recombinant apoptin in planta and its biological characteristics on cancerous cells. **University of Nottingham, Malaysia Campus.**

- Mr. Wang Eu Sheng (2015) (PhD). Construction and Molecular Characterisation of an Improved Chloroplast Transformation Vector System as a Versatile Delivery and Expression Platform for in-vitro Propagated Nicotiana benthamiana. **University of Nottingham, Malaysia Campus.**

- Ms. Sridevi Gorle (2014) (PhD). Receptor Targeted Gene Delivery Using Folate Ligand Conjugated Cationic Liposomes. **University of Kwazulu-Natal, Durban, South Africa.**

- Ms. Farhat Abjani (2017) (MSc). Strategies for improved management of Acanthamoeba keratitis. **Sunway University, Malaysia.**

INTELLECTUAL PROPERTY:

- 2019, "Malaysian Patent Pending No. PI 2019007511", METHOD AND KIT FOR DETECTION AND QUANTIFICATION OF GLOBOTRIAOSYLCERAMIDE, **Narayanan, K**., Ng, A.W.R., Osahor, A.N.

- 2019, "Malaysian Patent Pending No. PI 2019007709", NUCLEIC ACID MARKER KIT FOR THE FORMATION OF CUSTOMIZABLE NUCLEIC ACID MARKERS, **Narayanan, K**., Wong, Y.C., Ng, A.W.R., Osahor, A.N.

- 2018, Intellectual Property Corporation of Malaysia entitled "Circular DNA Linearization" PI 2018701391. Inventors: **Narayanan, K.,** Chen, Q., and P.S. Liew.

- 2003, United States Patent entitled "Method for Selection and Agents Useful for Same". Inventors: Ioannou, P., Jamsai, D., Nefedov, M., Orford, M., and **Narayanan, K**.

- 1999, International Patent Application No. PCT/AU99/00835 entitled "A Method of Recombination and Agents Useful for Same". Inventors: Ioannou, P., and **Narayanan, K**.

TEACHING EXPERIENCE:

- **Monash University Malaysia** (2009-present): Undergraduate years 1-3, and Honours

- **Malaysia University of Science and Technology, Malaysia** (2002-2005): Master of Science taught courses

- **University of Malaysia Sarawak, Malaysia** (1999-2002): Undergraduate years 1-3.

AWARDS:

- RISE (Research Internships in Science and Engineering) Worldwide Internship Funding from the German Federal Ministry of Education and Research, 2016-2021 (6 consecutive years).
- ITEX 2019: 30th International Invention, Innovation and Technology Exhibition 2019, KL, Silver Award. “EasyGb: The first diagnostic kit for Fabry disease, one of the rarest diseases in the world.”
- Monash University Pro Vice Chancellor’s Award for Excellence in Administration, 2012.
- Monash University Pro Vice Chancellor’s Award for Excellence in Research, 2011.
- University of Malaysia Sarawak PhD Training Award, 1996.
- Malaysian Society for Molecular Biology and Biotechnology “Promega Young Researcher Award” 1995, Finalist.